MIGMASTER 250 Plus

WELDING PACKAGES

INSTRUCTION MANUAL

This manual provides complete instructions for the following power sources starting with Serial Number MxxJ239531

ESAB ITEM NO. 0558003215, Migmaster 250 Plus - 208/230 vac, 1 ph., 50/60 Hz
ESAB ITEM NO. 0558003216, Migmaster 250 Plus - 230/460/575 vac, 1 ph., 50/60 Hz

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BE SURE THIS INFORMATION REACHES THE OPERATOR.
YOU CAN GET EXTRA COPIES THROUGH YOUR SUPPLIER.

CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.

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WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.“
3. Do not weld, cut or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

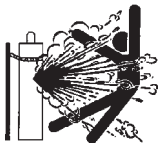
1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.
6. Make sure that all parts of your body are insulated from work and from ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.

ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.
3. Welders should use the following procedures to minimize exposure to EMF:
   A. Route the electrode and work cables together. Secure them with tape when possible.
   B. Never coil the torch or work cable around your body.
   C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
   D. Connect the work cable to the workpiece as close as possible to the area being welded.
   E. Keep welding power source and cables as far away from your body as possible.

FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.
5. **WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)**



CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding""
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.

DANGER **Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.**

WARNING **Means potential hazards which could result in personal injury or loss of life.**

CAUTION **Means hazards which could result in minor personal injury.**

ADVERTENCIA: Estas Precauciones de Seguridad son para su protección. Ellas hacen resumen de información proveniente de las referencias listadas en la sección "Información Adicional Sobre La Seguridad". Antes de hacer cualquier instalación o procedimiento de operación , asegúrese de leer y seguir las precauciones de seguridad listadas a continuación así como también todo manual, hoja de datos de seguridad del material, calcomanias, etc. El no observar las Precauciones de Seguridad puede resultar en daño a la persona o muerte.

PROTEJASE USTED Y A LOS DEMAS-- Algunos procesos de soldadura, corte y ranurado son ruidosos y requiren protección para los oídos. El arco, como el sol , emite rayos ultravioleta (UV) y otras radiaciones que pueden dañar la piel y los ojos. El metal caliente causa quemaduras. EL entrenamiento en el uso propio de los equipos y sus procesos es esencial para prevenir accidentes. Por lo tanto:

1. Utilice gafas de seguridad con protección a los lados siempre que esté en el área de trabajo, aún cuando esté usando careta de soldar, protector para su cara u otro tipo de protección.
2. Use una careta que tenga el filtro correcto y lente para proteger sus ojos, cara, cuello, y oídos de las chispas y rayos del arco cuando se esté operando y observando las operaciones. Alerte a todas las personas cercanas de no mirar el arco y no exponerse a los rayos del arco eléctrico o el metal fundido.
3. Use guantes de cuero a prueba de fuego, camisa pesada de mangas largas, pantalón de ruedo liso, zapato alto al tobillo, y careta de soldar con capucha para el pelo, para proteger el cuerpo de los rayos y chispas calientes provenientes del metal fundido. En ocaciones un delantal a prueba de fuego es necesario para protegerse del calor radiado y las chispas.
4. Chispas y partículas de metal caliente puede alojarse en las mangas enrolladas de la camisa , el ruedo del pantalón o los bolsillos. Mangas y cuellos deberán mantenerse abotonados, bolsillos al frente de la camisa deberán ser cerrados o eliminados.
5. Proteja a otras personas de los rayos del arco y chispas calientes con una cortina adecuada no-flamable como división.
6. Use careta protectora además de sus gafas de seguridad cuando esté removiendo escoria o puliendo. La escoria puede estar caliente y desprenderse con velocidad. Personas cercanas deberán usar gafas de seguridad y careta protectora.

FUEGO Y EXPLOSIONES -- El calor de las flamas y el arco pueden ocacionar fuegos. Escoria caliente y las chispas pueden causar fuegos y explosiones. Por lo tanto:

1. Remueva todo material combustible lejos del área de trabajo o cubra los materiales con una cobija a prueba de fuego. Materiales combustibles incluyen madera, ropa, líquidos y gases flamables, solventes, pinturas, papel, etc.
2. Chispas y partículas de metal pueden introducirse en las grietas y agujeros de pisos y paredes causando fuegos escondidos en otros niveles o espacios. Asegúrese de que toda grieta y agujero esté cubierto para proteger lugares adyacentes contra fuegos.
3. No corte, suelde o haga cualquier otro trabajo relacionado hasta que la pieza de trabajo esté totalmente limpia y libre de substancias que puedan producir gases inflamables o vapores tóxicos. No trabaje dentro o fuera de contenedores o tanques cerrados. Estos pueden explotar si contienen vapores inflamables.
4. Tenga siempre a la mano equipo extintor de fuego para uso instantáneo, como por ejemplo una manguera con agua, cubeta con agua, cubeta con arena, o extintor portátil. Asegúrese que usted esta entrenado para su uso.
5. No use el equipo fuera de su rango de operación. Por ejemplo, el calor causado por cable sobrecarga en los cables de soldar pueden ocasionar un fuego.
6. Después de termirar la operación del equipo, inspeccione el área de trabajo para cerciorarse de que las chispas o metal caliente ocasionen un fuego más tarde. Tenga personal asignado para vigilar si es necesario.
7. Para información adicional , haga referencia a la publicación NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible a través de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

CHOQUE ELECTRICO -- El contacto con las partes eléctricas energizadas y tierra puede causar daño severo o muerte. NO use soldadura de corriente alterna (AC) en áreas húmedas, de movimiento confinado en lugares estrechos o si hay posibilidad de caer al suelo.

1. Asegúrese de que el chasis de la fuente de poder esté conectado a tierra através del sistema de electricidad primario.
2. Conecte la pieza de trabajo a un buen sistema de tierra física.
3. Conecte el cable de retorno a la pieza de trabajo. Cables y conductores expuestos o con malas conexiones pueden exponer al operador u otras personas a un choque eléctrico fatal.
4. Use el equipo solamente si está en buenas condiciones. Reemplaze cables rotos, dañados o con conductores expuestos.
5. Mantenga todo seco, incluyendo su ropa, el área de trabajo, los cables, antorchas, pinza del electrodo, y la fuente de poder.
6. Asegúrese que todas las partes de su cuerpo están insuladas de ambos, la pieza de trabajo y tierra.
7. No se pare directamente sobre metal o tierra mientras trabaja en lugares estrechos o áreas húmedas; trabaje sobre un pedazo de madera seco o una plataforma insulada y use zapatos con suela de goma.
8. Use guantes secos y sin agujeros antes de energizar el equipo.
9. Apage el equipo antes de quitarse sus guantes.
10. Use como referencia la publicación ANSI/ASC Standard Z49.1 (listado en la próxima página) para recomendaciones específicas de como conectar el equipo a tierra. No confunda el cable de soldar a la pieza de trabajo con el cable a tierra.

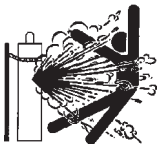
CAMPOS ELECTRICOS Y MAGNETICOS - Son peligrosos. La corriente eléctrica fluye através de cualquier conductor causando a nivel local Campos Eléctricos y Magnéticos (EMF). Las corrientes en el área de corte y soldadura, crean EMF alrrededor de los cables de soldar y las maquinas. Por lo tanto:

1. Soldadores u Operadores que use marca-pasos para el corazón deberán consultar a su médico antes de soldar. El Campo Electromagnético (EMF) puede interferir con algunos marca-pasos.
2. Exponerse a campos electromagnéticos (EMF) puede causar otros efectos de salud aún desconocidos.
3. Los soldadores deberán usar los siguientes procedimientos para minimizar exponerse al EMF:
   A. Mantenga el electrodo y el cable a la pieza de trabajo juntos, hasta llegar a la pieza que usted quiere soldar. Asegúrelos uno junto al otro con cinta adhesiva cuando sea posible.
   B. Nunca envuelva los cables de soldar alrededor de su cuerpo.
   C. Nunca ubique su cuerpo entre la antorcha y el cable, a la pieza de trabajo. Mantega los cables a un sólo lado de su cuerpo.
   D. Conecte el cable de trabajo a la pieza de trabajo lo más cercano posible al área de la soldadura.
   E. Mantenga la fuente de poder y los cables de soldar lo más lejos posible de su cuerpo.

HUMO Y GASES -- El humo y los gases, pueden causar malestar o daño, particularmente en espacios sin ventilación. No inhale el humo o gases. El gas de protección puede causar falta de oxígeno.

Por lo tanto:

1. Siempre provea ventilación adecuada en el área de trabajo por medio natural o mecánico. No solde, corte, o ranure materiales con hierro galvanizado, acero inoxidable, cobre, zinc, plomo, berílio, o cadmio a menos que provea ventilación mecánica positiva . No respire los gases producidos por estos materiales.
2. No opere cerca de lugares donde se aplique substancias químicas en aerosol. El calor de los rayos del arco pueden reaccionar con los vapores de hidrocarburo clorinado para formar un fosfógeno, o gas tóxico, y otros irritant es.
3. Si momentáneamente desarrolla inrritación de ojos, nariz o garganta mientras est á operando, es indicación de que la ventilación no es apropiada. Pare de trabajar y tome las medidas necesarias para mejorar la ventilación en el área de trabajo. No continúe operando si el malestar físico persiste.
4. Haga referencia a la publicación ANSI/ASC Standard Z49.1 (Vea la lista a continuación) para recomendaciones específicas en la ventilación.
5. **ADVERTENCIA-- Este producto cuando se utiliza para soldaduras o cortes, produce humos o gases, los cuales contienen químicos conocidos por el Estado de California de causar defectos en el nacimiento, o en algunos casos, Cancer. (California Health & Safety Code §25249.5 et seq.)**



MANEJO DE CILINDROS-- Los cilindros, si no son manejados correctamente, pueden romperse y liberar violentamente gases. Rotura repentina del cilindro, válvula, o válvula de escape puede causar daño o muerte. Por lo tanto:

1. Utilize el gas apropiado para el proceso y utilize un regulador diseñado para operar y reducir la presión del cilindro de gas . No utilice adaptadores. Mantenga las mangueras y las conexiones en buenas condiciones. Observe las instrucciones de operación del manufacturero para montar el regulador en el cilindro de gas comprimido.
2. Asegure siempre los cilindros en posición vertical y amárrelos con una correa o cadena adecuada para asegurar el cilindro al carro, transportes, tablilleros, paredes, postes, o armazón. Nunca asegure los cilindros a la mesa de trabajo o las piezas que son parte del circuito de soldadura . Este puede ser parte del circuito elélectrico.
3. Cuando el cilindro no está en uso, mantenga la válvula del cilindro cerrada. Ponga el capote de protección sobre la válvula si el regulador no está conectado. Asegure y mueva los cilindros utilizando un carro o transporte adecuado. Evite el manejo brusco de los

MANTENIMIENTO DEL EQUIPO -- Equipo defectuoso o mal mantenido puede causar daño o muerte. Por lo tanto:

1. Siempre tenga personal cualificado para efectuar l a instalación, diagnóstico, y mantenimiento del equipo. No ejecute ningún trabajo eléctrico a menos que usted esté cualificado para hacer el trabajo.
2. Antes de dar mantenimiento en el interior de la fuente de poder, desconecte la fuente de poder del suministro de electricidad primaria.
3. Mantenga los cables, cable a tierra, conexciones, cable primario, y cualquier otra fuente de poder en buen estado operacional. No opere ningún equipo en malas condiciones.
4. No abuse del equipo y sus accesorios. Mantenga el equipo lejos de cosas que generen calor como hornos, también lugares húmedos como charcos de agua , aceite o grasa, atmósferas corrosivas y las inclemencias del tiempo.
5. Mantenga todos los artículos de seguridad y coverturas del equipo en su posición y en buenas condiciones.
6. Use el equipo sólo para el propósito que fue diseñado. No modifique el equipo en ninguna manera.

INFORMACION ADICIONAL DE SEGURIDAD -- Para más información sobre las prácticas de seguridad de los equipos de arco eléctrico para soldar y cortar, pregunte a su suplidor por una copia de "Precautions and Safe Practices for Arc Welding, Cutting and Gouging-Form 52-529.

Las siguientes publicaciones, disponibles através de la American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, son recomendadas para usted:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding“
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding""
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

SIGNIFICADO DE LOS SIMBOLOS -- Según usted avanza en la lectura de este folleto: Los Símbolos Significan ¡Atención! ¡Esté Alerta! Se trata de su seguridad.

PELIGRO **Significa riesgo inmediato que, de no ser evadido, puede resultar inmediatamente en serio daño personal o la muerte.**

ADVERTENCIA **Significa el riesgo de un peligro potencial que puede resultar en serio daño personal o la muerte.**

CUIDADO **Significa el posible riesgo que puede resultar en menores daños a la persona.**

AVERTISSEMENT: Ces règles de sécurité ont pour objet d' assurer votre protection. Veillez à lire et à observer les précautions énoncées ci-dessous avant de monter l' équipement ou de commercer à l'utiliser. Tout défaut d'observation de ces précautions risque d'entraîner des blessures graves ou mortelles.

1. PROTECTION INDIVIDUELLE-- Les brûlures de la peau et des yeux dues au rayonnement de l'arc électrique ou du métal incandescent, lors du soudage au plasma ou à l'électrode ou lors du gougeage à l'arc, peuvent s'avérer plus graves que celles résultant d'une exposition prolongée au soleil. Aussi convient-il d'observer les précautions suivantes:

a. Portez un écran facial adéquat muni des plaques protectrices et des verres filtrants appropriés afin de vous protéger les yeux, le visage, le cou et les oreilles des étincelles et du rayonnement de l'arc électrique lorsque vous effectuez des soudures ou des coupes ou lorsque vous en observez l'exécution.
AVERTISSEZ les personnes se trouvant à proximité de façon à ce qu'elles ne regardent pas l'arc et à ce qu'elles ne s'exposent pas à son rayonnement, ni à celui du métal incandescent.

b. Portez des gants ignifugés à crispins, une tunique épaisse à manches longues, des pantalons sans rebord, des chaussures à embout d'acier et un casque de soudage ou une calotte de protection, afin d'éviter d'exposer la peau au rayonnement de l'arc électrique ou du métal incandescent. ll est également souhaitable d'utiliser un tablier ininflammable de façon à se protéger des étincelles et du rayonnement thermique.

c. Les étincelles ou les projections de métal incandescent risquent de se loger dans des manches retroussées, des bords relevés de pantalons ou dans des poches. Aussi convient-il de garder boutonnés le col et les manches et de porter des vêtements sans poches à l'avant.

d. Protégez des étincelles et du rayonnement de l'arc électrique les autres personnes travaillant à proximité à l'aide d'un écran ininflammable adéquat.

e. Ne jamais omettre de porter des lunettes de sécurité lorsque vous vous trouvez dans un secteur où l'on effectue des opérations de soudage ou de coupage à l'arc. Utilisez des lunettes de sécurité à écrans ou verres latéraux pour piquer ou meûler le laitier. Les piquetures incandescentes de laitier peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes de protection.

f. Le gougeage à l'arc et le soudage à l'arc au plasma produisent un niveau de bruit extrêmement élevé (de 100 à 114 dB) et exigent par conséquent l'emploi de dispositifs appropriés de protection auditive.

2. PRÉVENTION DES INCENDES-- Les projections de laitier incandescent ou d'étincelles peuvent provoquer de graves incendies au contact de matériaux combustibles solides, liquides ou gazeux. Aussi faut-il observer les précautions suivantes:

a. Éloigner suffisamment tous les matériaux combustibles du secteur où l'on exécute des soudures ou des coupes à l'arc, à moins de les recouvrir complètement d'une bâche non-inflammable. Ce type de matériaux comprend notamment le bois, les vêtements, la sciure, l'essence, le kérosène, les peintures, les solvants, le gaz naturel, l'acétylène, le propane et autres substances combustibles semblables.

b. Les étincelles ou les projections de métal incandescent peuvent tomber dans des fissures du plancher ou dans des ouvertures des murs et y déclencher une ignition lente cachée. Veiller à protéger ces ouvertures des étincelles et des projections de métal.

c. N'exécutez pas de soudures, de coupes, d'opérations de gougeage ou autres travaux à chaud à la surface de barils, bidons, réservoirs ou autres contenants usagés, avant de les avoir nettoyés de toute trace de substance susceptible de produire des vapeurs inflammables ou toxiques.

d. En vue d'assurer la prévention des incendies, il convient de disposer d'un matériel d'extinction prêt à servir immédiatement, tel qu'un tuyau d'arrosage, un seau à eau, un seau de sable ou un extincteur portatif.

e. Une fois le travail à l'arc terminé, inspectez le secteur de façon à vous assurer qu'aucune étincelle ou projection de métal incandescent ne risque de provoquer ultérieurement un feu.

3. CHOC ÉLECTRIQUE-- Le gougeage à l'arc et à l'arc au plasma exige l'emploi de tensions à vide relativement importantes; or, celles-ci risquent de causer des dommages corporels graves et même mortels en cas d'utilisation inadéquate. La gravité du choc électrique reçu dépend du chemin suivi par le courant à travers le corps humain et de son intensité.

a. Ne laissez jamais de surfaces métalliques sous tension venir au contact direct de la peau ou de vêtements humides. Veillez à porter des gants bien secs.

b. Si vous devez effectuer un travail sur une surface métallique ou dans un secteur humide, veillez à assurer votre isolation corporelle en portant des gants secs et des chaussures à semelles de caoutchouc et en vous tenant sur une planche ou une plate-forme sèche.

c. Mettez toujours à la terre le poste de soudage/coupage en le reliant par un câble à une bonne prise de terre.

d. N'utilisez jamais de câbles usés ou endommagés. Ne surchargez jamais le câble. Utilisez toujours un équipement correctement entretenu.

e. Mettez l'équipement hors tension lorsqu'il n'est pas en service. une mise à la masse accidentelle peut en effet provoquer une surchauffe de l'équipement et un danger d'incendie. Ne pas enrouler ou passer le câble autour d'une partie quelconque du corps.

f. Vérifiez si le câble de masse est bien relié à la pièce en un point aussi proche que possible de la zone de travail. Le branchement des câbles de masse à l'ossature du bâtiment ou en un point éloigné de la zone de travail augmente en effet le risque de passage d'un courant de sortie par des chaînes de

levage, des câbles de grue ou divers chemins électriques.

g. Empêchez l'apparition de toute humidité, notamment sur vos vêtements, à la surface de l'emplacement de travail, des câbles, du porte-électrode et du poste de soudage/coupage. Réparez immédiatement toute fuite d'eau.

4. VENTILATION-- La respiration prolongée des fumées résultant des opérations de soudage/coupage, à l'intérieur, d'un local clos, peut provoquer des malaises et des dommages corporels. Aussi convient-il d'observer les précautions suivantes:

a. Assurez en permanence une aération adéquate de l'emplacement de travail en maintenant une ventilation naturelle ou à l'aide de moyens mécaniques. N'effectuez jamais de travaux de soudage ou de coupage sur des matériaux de zinc, de plomb, de beryllium ou de cadmium en l'absence de moyens mécaniques de ventilation capables d'empêcher l'inhalation des fumées dégagées par ces matériaux.

b. N'effectuez jamais de travaux de soudage ou de coupage à proximité de vapeurs d'hydrocarbure chloré résultant d'opérations voisines de dégraissage ou de pulvérisation. La chaleur dégagée ou le rayonnement de l'arc peut déclencher la formation de phosgène -- gaz particulièrement toxique -- et d'autres gaz irritants, à partir des vapeurs de solvant.

c. Une irritation momentanée des yeux, du nez ou de la gorge constatée au cours de l'utilisation de l'équipement dénote un défaut de ventilation. Arrêtez-vous de travailler afin de prendre les mesures nécessaires à l'amélioration de la ventilation. Ne poursuivez pas l'opération entreprise si le malaise persiste.

d. Certaines commandes comportent des canalisations où circule de l'hydrogène. L'armoire de commande est munie d'un ventilateur destiné à empêcher la formation de poches d'hydrogène, lesquelles présentent un danger d'explosion; ce ventilateur ne fonctionne que si l'interrupteur correspondant du panneau avant se trouve placé en position ON (Marche). Veillez à manœuvrer cette commande en vérifiant si le couvercle est bien en place, de façon à assurer l'efficacité de la ventilation ainsi réalisée. Ne jamais débrancher le ventilateur.

e. Les fumées produites par l'opération de soudage ou de coupage peuvent s'avérer toxiques. Aussi est-il nécessaire de disposer en permanence d'un dispositif adéquat de ventilation de type aspirant, afin d'éliminer du voisinage de l'opérateur tout dégagement de fumée visible.

f. Consultez les recommandations particulières en matière de ventilation indiquées à l'alinéa 6 de la norme Z49.1 de l'AWS.

5. ENTRETIEN DE L'ÉQUIPEMENT-- Un équipement entretenu de façon défectueuse ou inadéquate risque non seulement de réaliser un travail de mauvaise qualité mais, chose plus grave encore, d'entraîner des dommages corporels graves, voire mortels en déclenchant des incendies ou des chocs électriques. Observez par conséquent les précautions suivantes:

a. Efforcez-vous de toujours confier à un personnel qualifié l'installation, le dépannage et l'entretien du poste de soudage et de coupage. N'effectuez aucune réparation électrique sur l'équipement à moins d'être qua-lifié à cet effet.

b. Ne procédez jamais à une tâche d'entretien quelconque à l'intérieur du poste de soudage/coupage, avant d'avoir débranché l'alimentation électrique.

c. Maintenez en bon état de fonctionnement les câbles, le câble de masse, les branchements, le cordon d'alimentation et le poste de soudage/coupage. N'utilisez jamais le poste ou l'équipement s'il présente une défectuosité quelconque.

d. Prenez soin du poste de soudage et de coupage et des équipements accessoires. Gardez-les à l'écart des sources de charleur, notamment des fours, de l'humidité, des flaques d'eau maintenez-les à l'abri des traces d'huile ou de graisse, des atmosphères corrosives et des intempéries.

e. Laissez en place tous les dispositifs de sécurité et tous les panneaux de l'armoire de commande en veillant à les garder en bon état.

f. Utilisez le poste de soudage/coupage conformément à son usage prévu et n'effectuez aucune modification.

6. INFORMATIONS COMPLÉMENTAIRES RELATIVES À LA SÉCURITÉ--

Pour obtenir des informations complémentaires sur les règles de sécurité à observer pour le montage et l'utilisation d'équipements de soudage et de coupage électriques et sur les méthodes de travail recommandées, demandez un exemplaire du livret N° 52529 "Precautions and Safe Practices for Arc Welding, Cutting and Gouging" publié par ESAB. Nous conseillons également de consulter les publications sui-vantes, tenues à votre disposition par l'American Welding Society, 550 N.W. LeJuene Road, Miami, FL 32126:

a. "Safety in Welding and Cutting" AWS Z49.1

b. "Recommended Safe Practices for Gas-Shielded Arc Welding "AWS A6. 1.

c. "Safe Practices for Welding and Cutting Containers That Have Held Combustibles" AWS-A6.0.

d. "Recommended Safe Practices for Plasma Arc Cutting" AWS-A6. 3.

e. "Recommended Safe Practices for Plasma Arc Welding" AWS-C5. 1.

f. "Recommended Safe Practices for Air Carbon Arc Gouging and Cutting" AWS-C5. 3.

g. "Code For Safety in Welding and Cutting" CSA-Standard W117. 2.

Industrial Ready-To-Weld Mig Package MigMaster 250 Plus

- *Rated 250 amps at 50% duty cycle*
- *DC welding output from 30 to 280 amps*
- *24 overlapping heat (voltage) steps for accurate fine tuning of arc characteristics*
- *Wire Feed speed range from 20 to 650 ipm; pulse width modulated, solid state control*
- *Built-in Spool-on-Gun control*
- *Low and High inductance taps for better control of short arc welding characteristics when using Argon mix or CO_2*
- *Heavy-Duty Four Roll Drive for positive grip of the wire*
- *Solid State Contactor reduces down time and maintenance related to mechanical contactors*
- *Convenient, Large Capacity Built-In Tool Box*
- *Dual "Easy-On" Cylinder Tray*
- *NAS Torch connector compatible with bayonet style torches*
- *Burnback adjustment Standard*
- *Quiet operation*

Specifications

Power Source

Rated Output (DC CV) ..... 250 amps @ 27volts
Open Circuit Voltage 55vdc
Primary Input Voltages* 208/230/380/400/460/575
Primary Input Current @ 250A load: 71/62/37/36/31/25
Duty Cycle ..... 208/230 Vac Model
..... 50%@60Hz. / 40%@50Hz.
DutyCycle ..... 208/230/380/400/460/575 Vac Model
..... 35% for 208/230/380/400
..... 50% for 460/575
Output Current Range 30-280
Net Weight ..... 250 lbs.(113 Kg)
Shipping Weight ..... 260 lbs.(117 Kg)
Dimensions assembled w/ wheels, cylinder rack & Handles;
..... W=25 in.(64cm) x L=42 in.(107cm) x H=34 in.(86cm)
** Depending on Model*

Wire Feeder

Feed Type ..... Push
Feed Rate ..... 20-650 IPM
Wire Sizes
Hard ..... .023" (0.6mm) - .045" (1.2mm)
Cored ..... .030" (0.8mm) - 1/16" (1.6mm)
Soft ..... .035" (0.5mm) - 3/64" (1.2mm)

GunMaster 250 Torch

Cooling ..... Air
Rating w/ Argon Mix Gas ..... 60% Duty Cycle - 200Amps
Rating w/ CO_2 Gas ..... 60% Duty Cycle - 300Amps

How to Order

Each of the following packages includes the power source with built-in wire feeder, factory installed undercarriage and cylinder rack, GunMaster 250 with NAS connector (bayonet), dual groove driveroll (.035-.045), gas regulator/flowmeter, 6 ft. gas hose, 15 ft. work cable and Mig Welding Handbook and free spool of wire.

	MigMaster 250 Plus - Ready-to-Weld Mig Packages
0558003491	Migmaster 250 Plus - 12-ft, 208/230vac Argon
0558003492	Migmaster 250 Plus - 15-ft, 208/230vac Argon
0558003493	Migmaster 250 Plus - 12ft, 208/230vac CO2
0558003494	Migmaster 250 Plus - 15ft, 208/230vac CO2
0558003495	Migmaster 250 Plus - 12ft, 200-575vac Argon
0558003496	Migmaster 250 Plus - 15ft, 200-575vac Argon
0558003497	Migmaster 250 Plus - 12ft, 200-575vac CO2
0558003498	Migmaster 250 Plus - 15ft, 200-575vac CO2

	MigMaster 250 Plus - Spool-on-Gun Mig Packages
0558003499	MM 250 Plus 230v 12'/ST-23A Argon
0558003500	MM 250 Plus 230v 15'/ST-23A Argon
0558003501	MM 250 Plus 575v 12'/ST-23A Argon
0558003502	MM 250 Plus 575v 15'/ST-23A Argon

Optional Equipment

Spot, Stitch Option 0558003239
Digital Meter Option 0558003330
ST-23A Spool Gun 19164
Requires Adapter 37301
MT-250SG Spool Gun 36779
Spool Spacer For 8" dia. spools 17511
Spool Spacer For 10" dia. spools 34330

Table 2.1 - Drive Roll & Guide Tube Selection

Wire Type / Diameter	Lower Drive Roll	Upper Pressure Roll	Guide Tube
Hard Wires ("V" groove)			
.023 in. (0.6mm)	21155	23612397	21163
.030 in. (0.8mm)	21155	23612397	21164
.035 in. (0.9mm)*	21156	23612397	21165
.040 in. (1.0mm)*	21156	23612397	21165
.045 in. (1.2mm)*	21156	23612397	21165
Soft Wires ("U" groove)(aluminum)			
.035 in. (0.9mm)	21158	23612397	21167**
3/64 in. (1.2mm)	21159	23612397	21168**
Cored Wires (Serrated "V" groove - lower)			
.030 in. (0.8mm)	21160	23612369	21164
.035 in. (0.9mm)	21160	23612369	21165
.040 in. (1.0mm)	21161	23612369	21165
.045 in. (1.2mm)	21161	23612369	21165
.052 in. (1.4mm)	21161	23612369	21166
1/16 in. (1.6mm)	21161	23612369	21166
Cored Wires (Serrated "V" groove - upper & lower)†			
.045 in. (1.2mm)	37319	37319	21165
.052 in. (1.4mm)	37319	37319	21166
1/16 in. (1.6mm)	37320	37320	21166

* Supplied with Migmaster 250 Plus.
** Requires Support Tube 21169.
† Recommended for use with soft cored wires that are easy to flatten.

Table 2.3 - Replacement Torch Nozzles

Standard Duty

No. 6 Nozzle, Tapered (3/8" I.D.) ..... P/N 998895
No. 8 Nozzle (1/2" I.D.), ... P/N 998893
No. 10 Nozzle (5/8" I.D.) ..... P/N 998894
No. 12S Spotweld Nozzle (3/4" I.D.) ..... P/N 17316

H**eavy-duty**:

No. 8 Nozzle (1/2" I.D.) ..... P/N 999471
No. 10 Nozzle (5/8" I.D.) ..... P/N 999472
No. 12 Nozzle (3/4" I.D.) ..... P/N 999473
No. 12 Spot Nozzle (3/4" I.D.) ..... P/N 999625

New **Long Life** MT Nozzles have a patented coating to reduce weld spatter and extend the life of the nozzle.

Long Life

No. 6 XL Nozzle, (MT Std.) 998895XL
No. 8 XL Nozzle, (MT Std.) 998893XL
No. 10 XL Nozzle, (MT Std.) 998894XL
No. 8 XL Nozzle, (MT HD) 999471XL
No. 10 XL Nozzle, (MT HS) 999472XL

Table 2.2 - GunMaster-250 Torch Accessories

Wire Size & Type	Contact Tips			Liners		
	Short (S)	Medium (M)	Long (L)	10'	12'	15'
Hard Wires & Cored Wires						
.023" (.6mm)	-	20543	999742	999743*	-	-
.030" (.8mm)	-	20544	996994	948850	17717	-
.035" (.9mm)	-	996995	996996	2075237	17718	2075238
.040" (1.0mm)	-	37287	37288			
.045" (1.2mm)	999578◆	37290◆	996998◆	2075237	17718	2075238
.052" (1.4mm)	948340◆	2075349◆	-	2075239	17719	2075240
1/16" (1.6mm)	948341◆	37289◆	-	2075239	17719	2075240
Soft Wires (aluminum)						
.035" (.9mm)	-	996995	996996	948862	-	-
.040" (1.0mm)	-	37287	37288			
3/64" (1.2mm)	999578	996999	996998	948863	-	-

(S) Short contact tips are recommended for proper wire stick out for flux cored wire welding.
(M) Medium contact tips are recommended for proper wire stick out in spray transfer Mig welding.
(L) Long contact tips are recommended for good visibility and proper wire stick in dip transfer Mig welding.
* Requires support liner for .023" wire. Order P/N 999797.
◆ New ID for improved arc performance on steel/flux cored wire.

2.1 GENERAL

This manual has been prepared especially for use in familiarizing personnel with the design, installation, operation, maintenance, and troubleshooting of this equipment. All information presented here in should be given careful consideration to assure optimum performance of this equipment.

2.2 RECEIVING-HANDLING

Upon receipt and prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading and freight bill will be furnished by the carrier on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Part, Serial and Model Numbers of the equipment be supplied.

Figure 2.1

For future convienence, record Stock Number & Serial Number Information here:

Console Stock Number

Serial Number

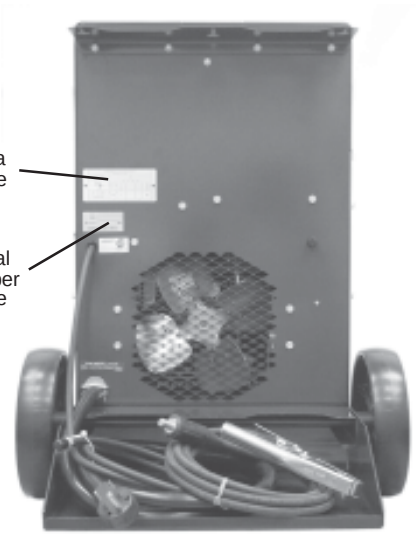


Figure 2.2

2.3 DESCRIPTION

The Migmaster 250 Plus is a portable compact welding system designed for fine wire, (.023, .030, .035 and .045 in.) welding using the short arc method, as well as for spray arc aluminum, short arc and spray arc stainless steel and spray arc cored wires. It incorporates a four roll heavy duty wire drive, running gear with provisions for two gas cylinders, tool compartment, and a ST-23A/MT-250SG spool-on-gun control.

2.3.1 POWER SUPPLY

The power supply consists of a tapped single phase transformer, tap selection switches, secondary contactor, single phase full wave rectifier, stabilizing reactor with high and low taps, slope resistor, filtering capacitors and internal output connections for polarity reversal.

2.3.2 WIRE FEEDER

The wire feeder pushes .023, .030, .035 and .045 in. wire at speeds up to 650 IPM. Dynamic braking prevents excessive wire overrun. A double grooved drive rolls (.035 and .045 in. - supplied) provides a convenient means of changing the setup for either wire size.

The wire feeder is built into the power supply cabinet, and is housed in a compartment separated from the welding machine components. Machine ventilation is not drawn through this compartment, thus helping to keep the wire and feeding mechanism clean.

2.3.3 GUNMASTER 250 WELDING TORCH (see F15-612)

The lightweight air cooled welding gun included in selected systems is supplied complete and ready to weld .035 in. steel wire. It is built with a one piece service conduit and includes a 45 degree gooseneck. Changing the contact tip to .045 in. allows the use of the larger wire.

2.3.4 CONTROLS

The built-in spool-on-gun adaptor and control, when used in conjunction with the optional ST-23A or MT-250GS torch, permits the use of aluminum wire welding with the machine. An optional spot/stitch control allows a welder to spot or stitch weld within a range of 0.4 to 3.5 seconds.

2.3.5 RUNNING GEAR

The Migmaster 250 Plus is equipped with a running gear w/swiveled front wheels and a gas cylinder support. The cylinder rack has been especially designed to accomodate "easy on" cylinder mounting for added convienence.

2.4 OPTIONAL ACCESSORIES

2.4.1 SPOT/STITCH/ANTI-STICK MODULE, P/N 0558003239

This easy-to-install, plug-in module mounts inside the feeder compartment and replaces the original factory installed Burnback module. This module enables the operator to use the Migmaster 250 Plus for Spot or Stitch or Continuous welding operations. It also includes an adjustable Anti-Stick feature that allows the selection of various wire burnback times to prevent wire from sticking in the weld pool at the end of a weld. For operating instructions see Section 4.6.

If this module is ordered to perform Spot welding operations, it is recommended that you also order a #12S Spotweld Nozzle. See the welding torch sales catalog page for available nozzle options.

2.4.2 DIGITAL VOLT/AMMETER MODULE, P/N 0558003330

This easy-to-install, plug-in module mounts in place of the original front panel of the electronics module. This unique meter module alternately displays welding voltage and current (of the dial-set welding condition) every 4-seconds. Two L.E.D.'s labeled Amps and Volts provided below the meter windows, alternately illuminate to indicate which condition is being displayed. The voltage indication is displayed in 1/10-volt increments (e.g.: 20.5), while the current indication is usually displayed in three-whole digits (e.g.: 225). After the torch trigger is released, the meter will continue to flash for 20-seconds the last condition used during welding. At the end of this time, the meter will reset to zero.

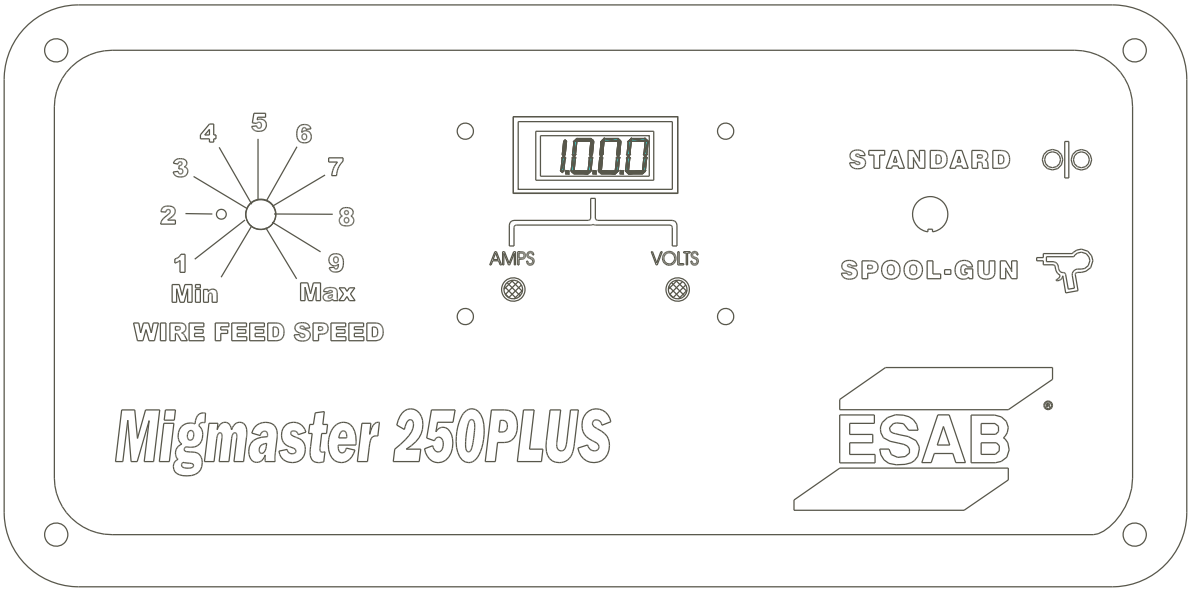


Figure 2.3 - Digital Volt/Ammeter Panel, PN 0558003330

2.4.3 ST-23A SPOOL-ON-GUN TORCH, P/N 19164 (see F14-353)

The Migmaster 250 Plus unit is equipped with a built-in control for the ST-23A Spool-On-Gun welding torch. The ST-23A is a high performance, 250 ampere continuous duty spool-on-gun torch designed for the mig welding process. It is completely portable (up to 30-ft.), air-cooled and hand operated, and weighs less than three (3) pounds. The gun is equipped with lines that are 30 feet long. For installation and operation, see Section 4.5.

2.4.4 MT-250GS SPOOL-ON-GUN TORCH, P/N 36779 (see F15-380)

The Migmaster 250 Plus unit is equipped with a built-in control for the MT-250GS Spool-On-Gun welding torch. The air-cooled ST-23A is a medium duty, 200 ampere continuous duty spool-on-gun torch designed for the mig welding process. The gun is equipped with lines that are 25 feet long. For installation and operation, see Section 4.5.

2.5 SAFETY

Before the equipment is put into operation, the safety section at the front of this manual should be read completely. This will help avoid possible injury due to misuse or improper welding applications.

The symbol ⚠ which precedes safety notes appearing throughout this manual means **"Attention! Be Alert! Your safety is involved."** The definitions relating to the DANGER, WARNING and CAUTION safety notations are described at the end of the Safety Section in the front of this manual -- read them and their specific text references carefully.

DANGER

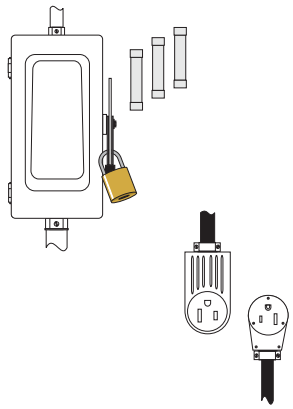
Only qualified personnel should make these changes. Make certain the primary power has been disconnected and all safety procedures have been followed before proceeding with these instructions.

CAUTION

Do not place any filtering device over the intake air passages of the welding machine as this would restrict the volume of intake air and thereby subject the welding machine internal components to an overheating condition and subsequent failure. Warranty is void if any type of filtering device is used.

WARNING

Before making electrical input connections to the welding machine, "Machinery Lockout Procedures" must be employed. If the connections are to be made from a line disconnect switch, the switch should be padlocked in the off position. If the connection is made from a fusebox, remove the fuses from the box and padlock the cover in the closed position. Attach a red tag to the line disconnect switch (or fuse box) to warn others that the circuit is being worked on. If the plug-cap is used, remove plug from receptacle.



III. INSTALLATION

This manual has been prepared for use by an experienced operator. It provides information to familiarize the operator with the design, installation and operation of the Migmaster 250 Plus model power source. DO NOT attempt to install or operate this equipment until you have read and fully understand these instructions. The information presented here should be given careful consideration to ensure optimum performance of this equipment.

3.1 LOCATION

A proper installation site should be selected for the welding machine, if the unit is to provide dependable service and remain relatively maintenance free.

A proper installation site permits freedom of air movement into and out of the welding machine, and also least subjects the unit to dust, dirt, moisture, and corrosive vapors. A minimum of 18 inches (46 cm) unrestricted space must be maintained between the welding machine side, rear panels and the nearest obstruction.

The installation site should also permit easy removal of the welding machine outer enclosure for maintenance functions.

If a forklift vehicle is used for lifting the unit, be sure that the lift forks are long enough to extend completely under the base.

3.2 ELECTRICAL INPUT REQUIREMENTS

The Migmaster 250 Plus is available in either a dual voltage model designed to be operated from single phase 208/230Vac 50/60Hz., or a multi-voltage model designed to operate from single phase 208/230/380/400/460/575 Vac 50/60Hz.. The primary input voltage requirements are shown on the welding machine nameplate.

3.3 ELECTRICAL INPUT CONNECTIONS

3.3.1 208/230 Vac 50/60 Hz. Model

The input power cord on dual voltage model (208/230) Volts primary input model is provided with an attachment plugcap. The plugcap will mate with a 250 Volts, 50 Ampere receptacle conforming to NEMA 6-50 R configuration.

The receptacle should be wired to a separately fused disconnect or circuit breaker (FIG. 3.1). This disconnect or breaker can be wired to a single phase system or to two conductors of a three phase system. A third conductor for grounding should also be connected between the disconnect and the receptacle. The primary power leads must be insulated copper conductors. Either rubber covered cable or conduit (flexible or solid) may be used. Table 3-1 provides recommended input conductors and line fuse sizes.

3.3.2 208/230/380/400/460/575 Vac 50/60 Hz. Model

The 208/230/380/400/460/575 primary input voltage unit is provided with a three conductor primary input cable without plugcap. This cable may be fitted with a suitable user supplied plugcap or may be connected directly into the fused disconnect box. If connecting directly to the fused disconnect box, the ground conductor of this cable must be connected to a reliable earth ground. The white and black conductors of this cable must be connected to the separately fused lines of the disconnect or breaker as shown in Figures 3.1.

WARNING

It is recommended that a line disconnect switch be installed in the input circuit to the welding machine. This would provide a safe and convenient means to completely remove all electrical power from the welding machine whenever it is necessary to perform any internal function on the unit.

Table 3.1 Input Conductor and Fuse Size

Primary Input Volts	Full Load Line Amperes	Fuse Size	Recommended	
			Primary Input Conductor Size	Ground Conductor Size
208	71	90	8	8
230	62	90	8	8
380	37	50	10	10
400	36	50	10	10
460	31	40	12	12
575	25	30	12	12

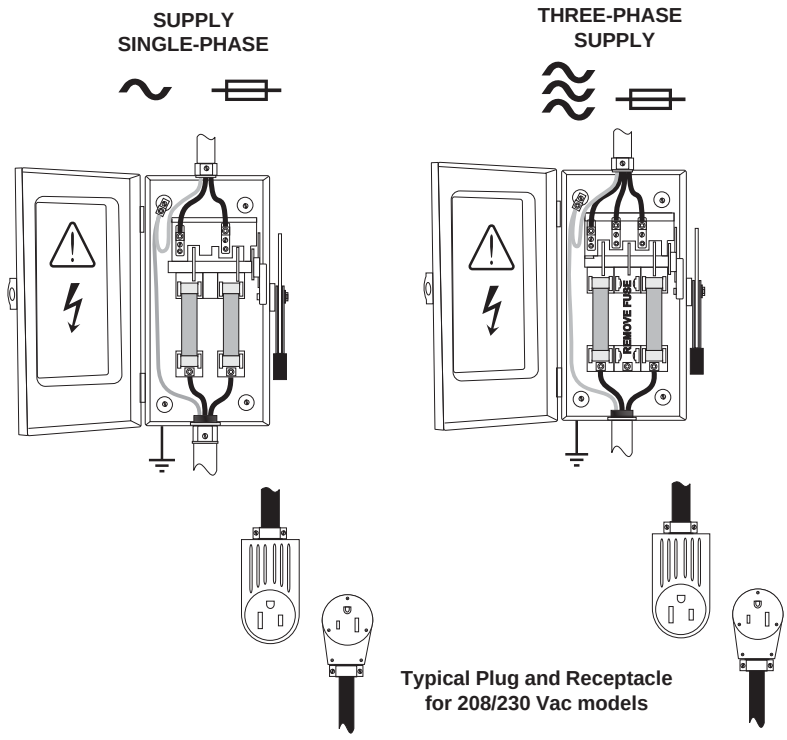


Figure 3.1 - Typical Configuration - Customer Supplied Fused Line Disconnect Switch, Wall Receptacle and Plug - Single or Three Phase.

3.4 INPUT VOLTAGE CHANGE-OVER CONNECTIONS

All machines leave the factory with their primary electrical input requirements internally-connected for the highest voltage rating available in each model (e.g.: 230-volt for the 208/230-volt units; and 575-volt for the "multi-voltage" units).

Before switching the voltage taps, verify the actual voltage requirement as well as the current voltage connection to be certain re-connection is necessary. If voltage tap re-connection is necessary, the following paragraphs cover the procedure to switch the voltage taps to the desired input configuration.

3.4.1 CHANGE-OVER for the 208/230 Vac 50/60 Hz. Model

Fig. 3.2 shows the 230v and 208v connections for the 208/230 dual voltage model. Change over is made by removing the right side panel below the wire feed compartment and switching the primary transformer tap at the pigtail from the top of the power switch with the unused alternate voltage tap located next to the main transformer. Both voltage taps (the one currently connected to the switch and the unused alternate voltage) are marked with the input voltage requirement. All units are supplied from the factory connected for the highest voltage (230 vac).

3.4.1A CONNECTING FOR 208 VAC INPUT

Remove the side panel and locate the 208 Vac lead (Fig. 3.2 & 3.4). Cut the tie-wrap to remove the insulation sleeving. Cut the tie-wraps on the insulation sleeving covering the 230 Vac connection to the pigtail lead from the power switch. Expose the terminals buy sliding the sleeving over the pigtail toward the power switch. Disconnect the 230 Vac lead from the pigtail as shown in Fig. 3.3 and connect the 208 Vac lead using the same hardware. Tighten securely. Slide the insulation sleeving back over the lug connection and secure with tie-wraps. Insulate the 230 Vac lead with sleeving removed from the 208 Vac tap and re-position to a safe area beside the transformer (see Fig. 3.2), leaving a minimum of one inch clearance from other components and the side panel. Replace the side panel.

3.4.1B CONNECTING FOR 230 VAC INPUT

After the panel is removed, locate the 230 Vac lead (Fig. 3.2 & 3.4) and cut the tie-wrap to remove the insulation sleeving. Cut the tie-wraps on the insulation sleeving covering the 208 Vac connection to the pigtail lead from the power switch. Expose the terminals buy sliding the sleeving over the pigtail toward the power switch. Disconnect the 208 Vac lead from the pigtail as shown in Fig. 3.3

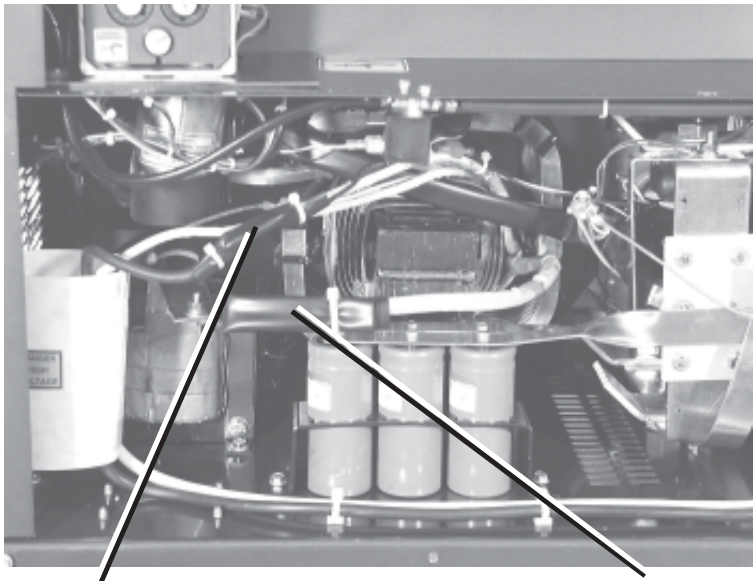


Figure 3.2 Input Voltage Change-Over Connections for the 208/230 Vac Model

and connect the 230 Vac lead using the same hardware. Tighten securely. Slide the insulation sleeving back over the lug connection and secure with tie-wraps. Insulate the 208 Vac lead with sleeving removed from the 230 Vac tap and re-position to a safe area beside the transformer (see Fig. 3.2), leaving a minimum of one inch clearance from other components and the side panel. Replace the side panel.

DANGER

When changing the input voltage connections, the unused lead must be insulated and positioned to prevent contact with any other internal components of the machine or the machine side panel. The clearance between the unused lead and other components must be at least one inch. FAILURE TO INSULATE AND POSITION THIS LEAD PROPERLY WILL CAUSE A SERIOUS SHOCK HAZARD.

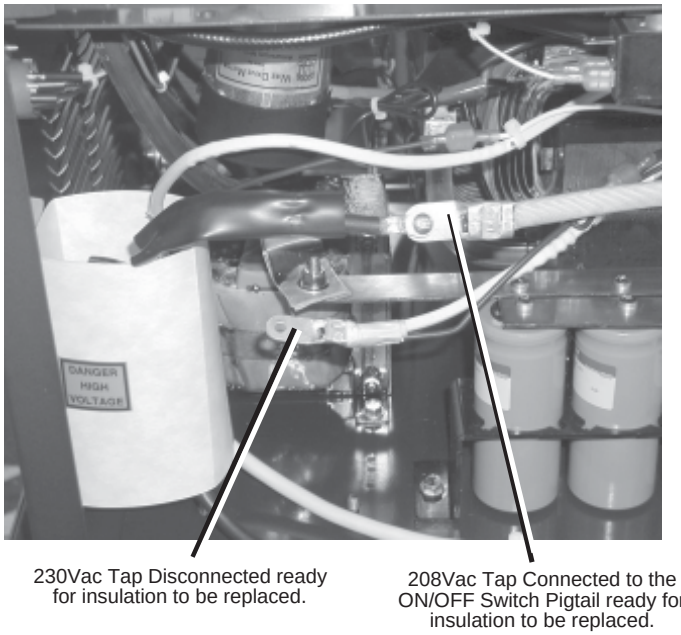

230Vac Tap Disconnected ready for insulation to be replaced.
208Vac Tap Connected to the ON/OFF Switch Pigtail ready for insulation to be replaced.

Figure 3.3 Change-Over Connections Exposed 208/230 Vac Model

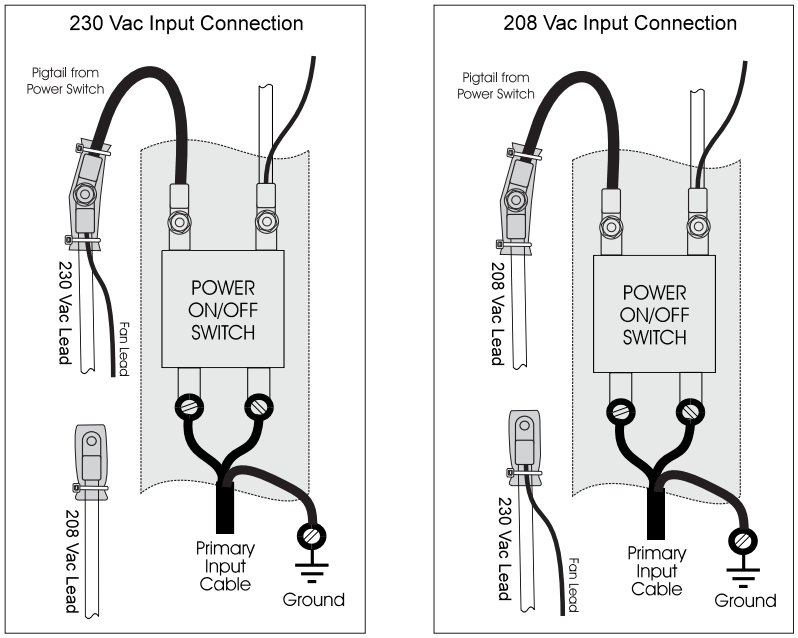


Figure 3.4 Input Voltage Change-Over Connections for the 208/230 Vac Model

3.4.2 CHANGE-OVER for the 208/230/380/400/460/575 Vac Model

Figures 3.5.a-f show how to reconfigure the "multi-voltage" model from the factory-connected 575-volt input to other available voltage inputs (208, 230, 380, 400, or 460 volts). The voltage change-over terminal board is located inside the tool compartment on the left side of the machine. The board contains copper links and a flex jumper which must be reconnected to match the voltage designation for the input you plan to use. To gain access, remove the screw from the upper left corner and swing the plexiglass cover clockwise. Do not remove the screw in the right-hand corner. **Once the links have been changed to the proper configuration be sure to close the cover and secure in place.**

Figure 3.5a - Input Voltage Links 575Vac Link Configuration (Factory Supplied)

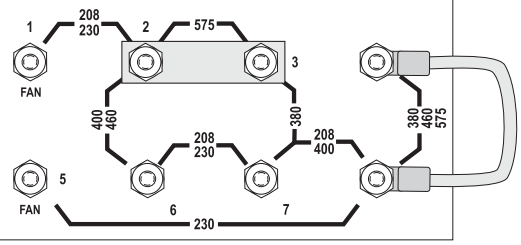


Figure 3.5b - Input Voltage Links 460Vac Link Configuration

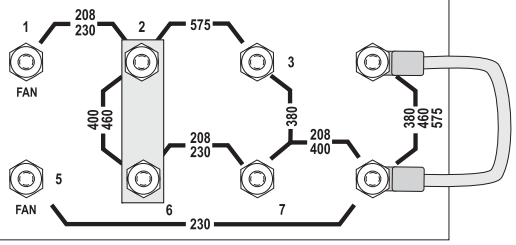


Figure 3.5c - Input Voltage Links 400Vac Link Configuration

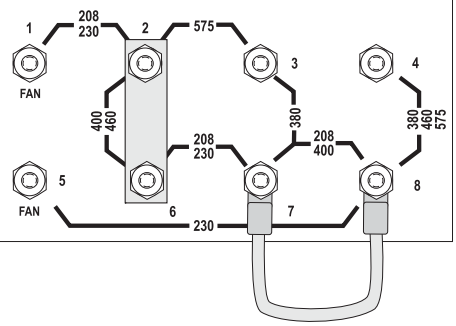


Figure 3.5d - Input Voltage Links 380Vac Link Configuration

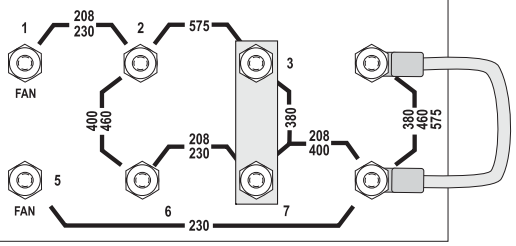


Figure 3.5e - Input Voltage Links 230Vac Link Configuration

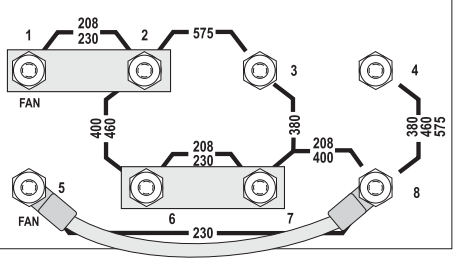
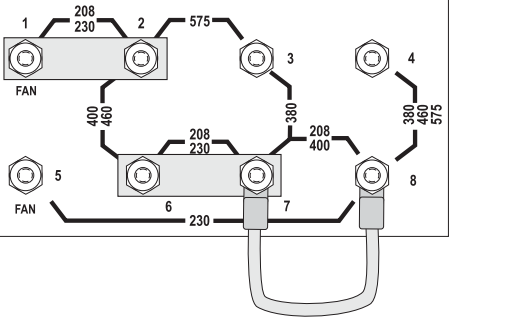


Figure 3.5f - Input Voltage Links 208Vac Link Configuration



3.5 SECONDARY OUTPUT CONNECTIONS

The Migmaster 250 Plus Welding System is a completely self-contained welding system that features the welding output receptacles conviently located on the front panel to allow easier setup of the weld polarity. Two levels of Inductance are available to fine tune arc characteristics for specific applications and shield gases. To set up the system for welding, simply connect the torch pigtail to the apropriate output receptacle for the polarity desired and Inductance. To change the polarity, simply reverse the torch pigtail and the work cable plug on the front panel of the machine.

D.C. Reverse Polarity (Electrode Positive) is generally used for all solid wire applications in the short circuiting arc and spray arc mode.

D.C. Straight Polarity (Electrode Negative) is generally used for all self shielded flux-core wire applications and some specialized gas shielded flux-core applications.

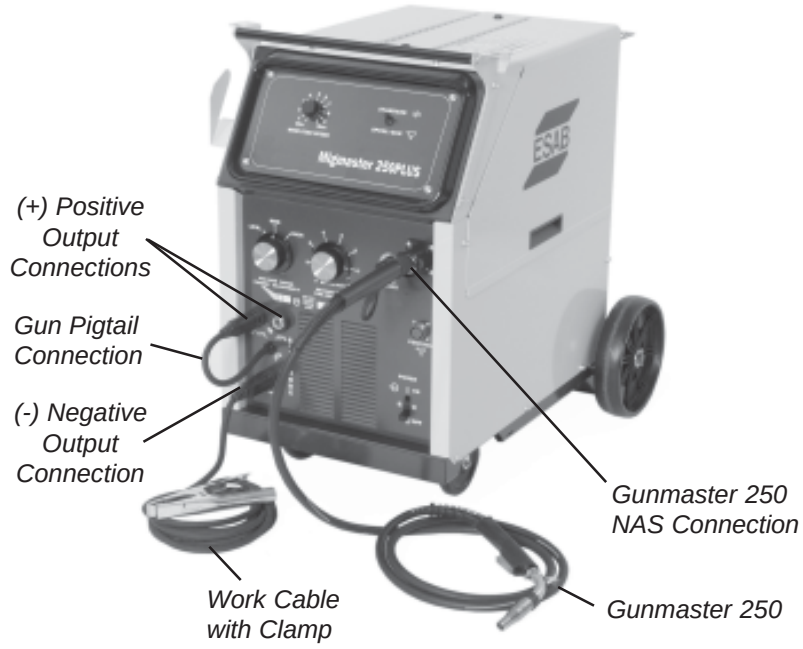


Figure 3.6 Secondary Connections

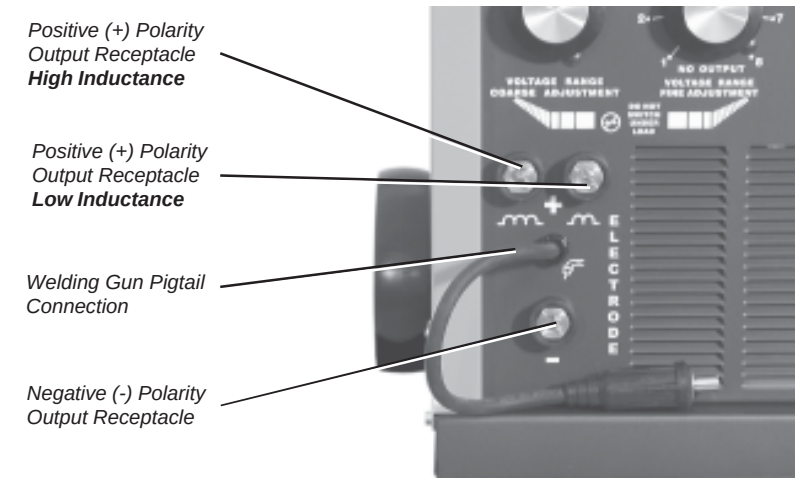

Positive (+) Polarity Output Receptacle **High Inductance**
Positive (+) Polarity Output Receptacle **Low Inductance**
Welding Gun Pigtail Connection
Negative (-) Polarity Output Receptacle
ELECTRODE

Figure 3.7 SecondaryOutput Connections

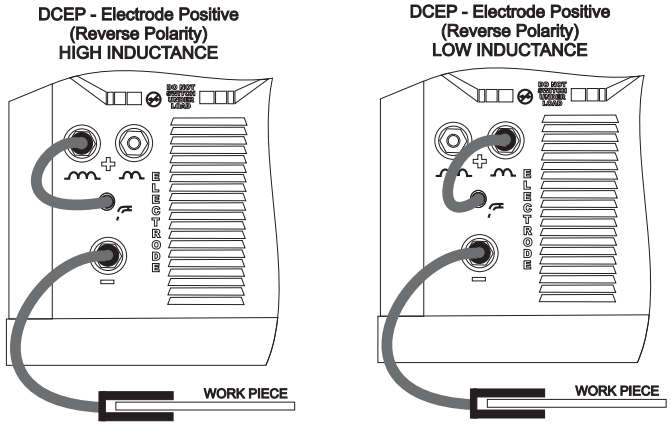


Figure 3.8 Output Connections for DCEP (Reverse Polarity) Operation

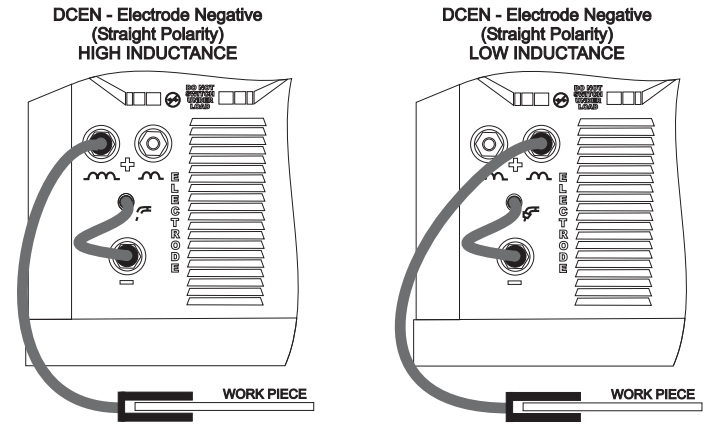


Figure 3.9 Output Connections for DCEN (Straight Polarity) Operation

Selecting the proper Inductance for a specific application and shield gas is mostly a matter of personal preference. The Inductance setting will change the crispness of the welding arc and change bead shape by affecting the weld pool fluidity. Table 3.2 is a general guide to setting Inductance level.

Table 3.2 Recommended Output Inductance Tap Connections for Short-Arc Welding

Welding Current	Stainless Steel Solid Wires	Carbon Steels Solid Wires				
	Helium/Argon Based Shielded Gases	Argon Based Shielding Gases				CO_2 Shielding Gas
	All Wire Diameters	.023" (0.6mm)	.030" (0.8mm)	.035" (0.9mm)	.045" (1.2mm)	All Wire Diameters
< 100 amps	high tap	high tap	high tap	high tap	high tap	low tap
125 amps	high tap	high or low*	high or low*	high or low*	high or low*	low tap
150 amps	high tap	N R	low tap	low tap	low tap	low tap
> 200 amps	high tap	N R	N R	low tap	low tap	low tap

Notes: **T**he above chart shows the recommended output inductance tap connection for **Mig Short Circuiting Transfer**.
For **Mig Spray Arc Transfer** (stainless or carbon steel) - use low tap
For **Flux Cored Wire** (all types) - use low tap
NR - Not Recommended
* The best connection (high tap or low tap) depends on the specific welding application and personal preference.

3.6 TORCH CONNECTIONS

The GUNMASTER 250 supplied with the Migmaster 250 Plus System is provided with a NAS type adapter which directly connects to the torch fitting mounted on the front panel. Line up the power pin, push on and tighten locking screw. To connect a spool-on-gun torch (ST-23A/MT-250GS) see Section 4.5.

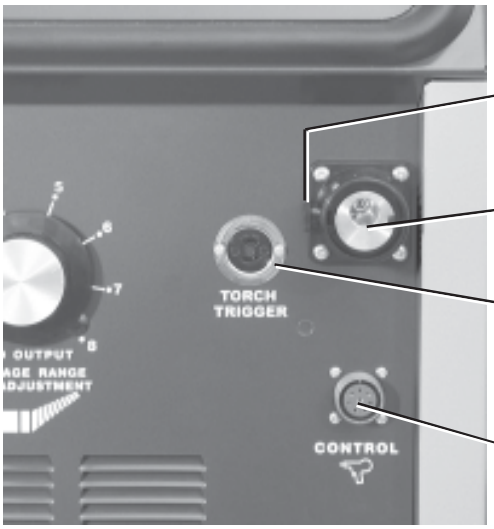


Figure 3.10 Torch Connections

3.7 WELDING WIRE SPOOL

Install a spool of welding wire on the hub as follows:

A. Remove the retaining pin from spool hub.
B. Place wire spool on hub to rotate clockwise as wire is unwound; hub pin must engage hole in spool.
C. Replace the retaining pin.

CAUTION

Power supply contactor becomes energized the moment the torch trigger is depressed. Arcing can occur if the wire is brought to a ground. Keep the torch away from ground until welding is to begin.

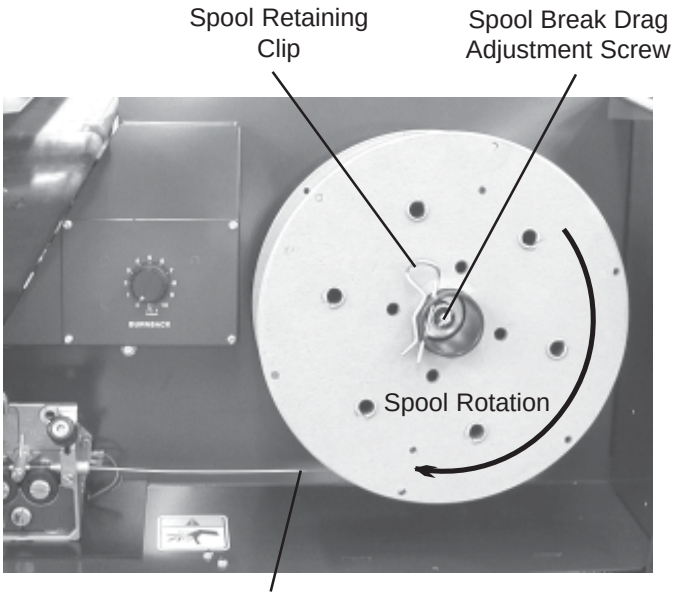


Figure 3.11 Fitting the Wire Spool

3.8 WIRE FEEDER MECHANISM

3.8.1 DRIVE ROLLS

The drive roll has two grooves: the small groove feeds 0.035 in. diameter wire, the large groove feeds 0.045 in. wire. The groove nearest the gear motor feeds the wire. If the required groove is not in that position:

A. Release the drive roll pressure adjustment lever and lift the upper drive roll assembly arm upward.
B. Remove the drive roll guard retaining screw and remove the guard.
C. Remove the two (2) screws holding the lower drive rolls to the gear.
D. Reverse the drive roll on the drive roll shaft.
E. Replace the drive roll retaining screws and tighten.
F. Lower the upper drive roll assmebly and secure the drive roll pressure lever. Adjust pressure as required - DO NOT OVER TIGHTEN.
G. Replace the drive roll guard and tighten the retaining screw.

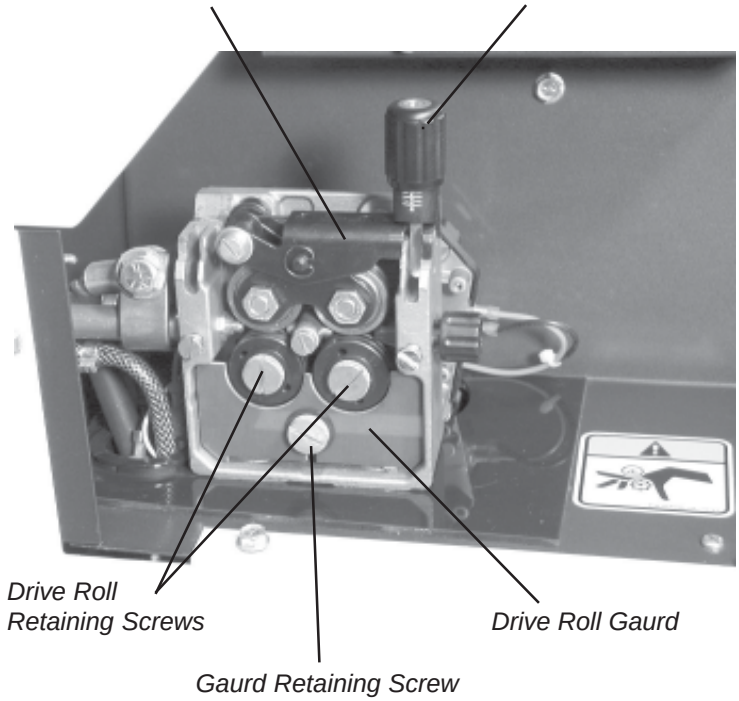

Upper Drive Roll Assembly Arm
Drive Roll Pressure Adjustment Lever
Drive Roll Retaining Screws
Drive Roll Gaurd
Gaurd Retaining Screw

Figure 3.12 Wire Drive Stand

3.8.2 THREADING WELDING WIRE

A. Turn off power switch.
B. Release upper drive roll pressure assembly and lift upward. Check that proper wire diameter groove is in the inner position.

CAUTION: Before threading welding wire through casing, make sure chisel point and burrs have been removed from wire end to prevent wire from jamming in gun casing or liner.

WARNING

As with any work area, make sure safety glasses with side shields are worn when handling or changing wire or clipping wire off at the spool or at the end of the torch. Hold onto the wire coming off the spool with one hand before clipping. Serious eye injury can result due to the springiness of the wire which can quickly unravel, or a cut wire end which may shoot across the room.

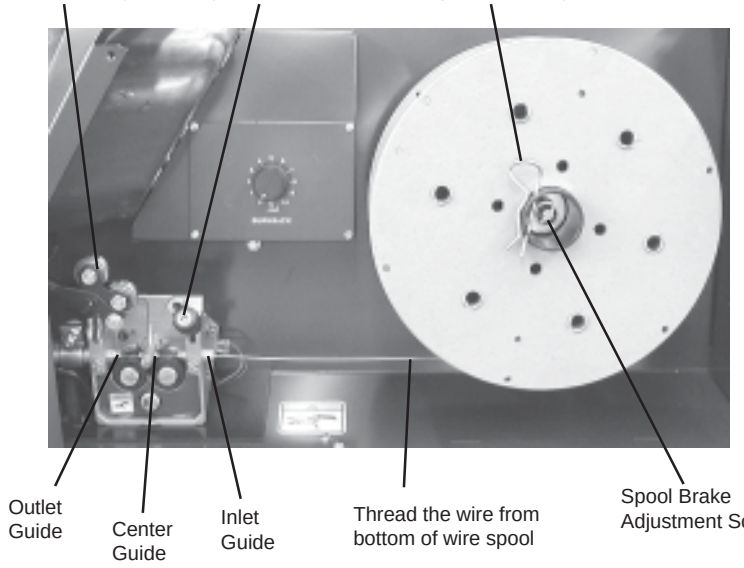

Lift Upper Drive Roll Assembly
Drive Roll Pressure Adjustment Lever
Reel Hub Spool Retaining Pin
Outlet Guide
Center Guide
Inlet Guide
Thread the wire from bottom of wire spool
Spool Brake Adjustment Screw

Figure 3.13 Threading the Wire

WARNING

When the power switch is on, and gun trigger is depressed, the electrode wire becomes electrically hot, and the wire feed rolls are activated.

C. Feed the wire from the spool through the inlet guide, across the drive roll groove, through the center guide and into gun outlet guide.

Make sure that the proper “outlet guide tube” is inserted into the front-panel gun fitting for the size and type of wire being used, see Table 2.1 for wire feed accessories.

To insure proper wire feeding, it is important that the wire be kept clean and that the drive rolls be periodically cleaned of any chips or scale that might be carried into the gun liner and cause sticking.

D. Lower pressure roll assembly and secure. Check that the gears mesh. Feed wire through to gun tip with gun trigger (power ON).

3.9 SPOOL BRAKE ADJUSTMENT

Brake disc friction should provide enough drag to keep the wire spool or coil from spinning freely after wire feed stops. If adjustment is required, turn adjusting screw clockwise to increase drag, counterclockwise to decrease it. Drag should be just low enough to limit wire overrun.

3.10 CONNECTION OF SHIELDING GAS SUPPLY

CAUTION

Do Not adapt R-33-FM-580 for use with CO_2. Relief device may rupture if CO_2 is used with the R-33-FM-580. For CO_2 service, order R-33-FM-320, P/N 21558.

The R-33-FM Regulator-Flowmeter is designed for use with high pressure cylinders of shielding gas. It is adjustable for delivering up to 50 cfh through the torch. To set up the system do the following:

WARNING

Never stand directly in front of or behind the regulator when opening the cylinder valve. Always stand to one side.

A. With the cylinder cap in place CAREFULLY slidethe cylinder of gas onto the Migmaster 250 Plus cylinder rack.
B. Secure the cylinder to the unit, using the chain provided.
C. Unscrew the cylinder cap.
D. **Be sure to keep your face away from the valve outlet to protect your eyes.** Crack the cylinder valve slightly, just for an instant, to blow away any dirt or dust which may have accumulated in the cylinder valve outlet.

CAUTION

For R-33-FM-320 Flowmaster be sure to install fiber washer between union nut and cylinder valve seat.

E. Attach the regulator to the cylinder valve, tighten the union nut securely with a 1-1/8in. open end or an adjustable wrench.
F. Attach the gas hose from the rear of the Migmaster 250 Plus to the regulator outlet connection (see Fig. 3.14).
G. Slowly open the cylinder valve a fraction of a turn. When the regulator pressure gauge pointer stops moving, open the cylinder valve fully.
H. Using a leak test solution, such as P/N 998771 (8 oz. container) or soapy water, test for leakage about the cylinder valve stem, the regulator inlet connection, and the hose connections at the regulator and at the Migmaster 250 Plus for leakage. Correct any leaks before starting work.
I. If work is to be stopped for a half-hour or more, or the regulator is to be removed from the cylinder, shut down the regulator as follows:
   a. Close the cylinder valve.
   b. Release gas from the regulator by closing the torch trigger lever.
   c. When pressure gauge drops to zero, the regulator is de-pressurized and shutdown.
J. Each regulator is equipped with a porous metal inlet filter, P/N 71Z33, pressed into the regulator inlet nipple. No regulator should be connected to a cylinder or station valve unless it contains this filter. You can replace the filter if you have reason to do so. To remove a filter refer to the regulator instruction literature for details.
K. Regulators in need of repair should be returned to your Welding Equipment distributor or to an authorized Remanufacturing Center.

WARNING

If welding is performed in a confined area, shielding gas leaks could result in a buildup of shielding gas concentration, displacing oxygen, thereby endangering personnel entering the area.

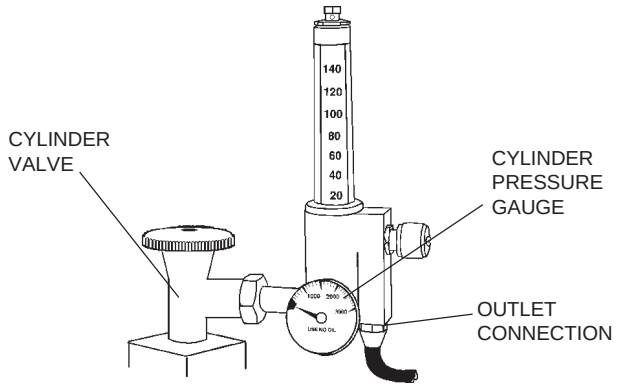


Figure 3.14 R-33-FM-580 Regulator

WARNING

A good electrical connection to the work is essential to proper welding operation and to prevent electric shock.

3.11 WELDING CABLE CONNECTIONS

Connect the work clamp solidly to the workpiece or work table. Clamp onto a bare metal area.

Welding cables should be kept as short as possible and be of adequate current carrying capacity. Resistance of the welding cables and connections causes a voltage drop which is added to the voltage drop of the arc. Excessive cable resistance may result in a reduction of the maximum usable current output of the equipment.

The proper operation of this equipment is to a large extent dependent on the use of welding cables and connections which are in good condition and of adequate size.

IV. OPERATION

4.1 CONTROLS (See Figure 4.1)

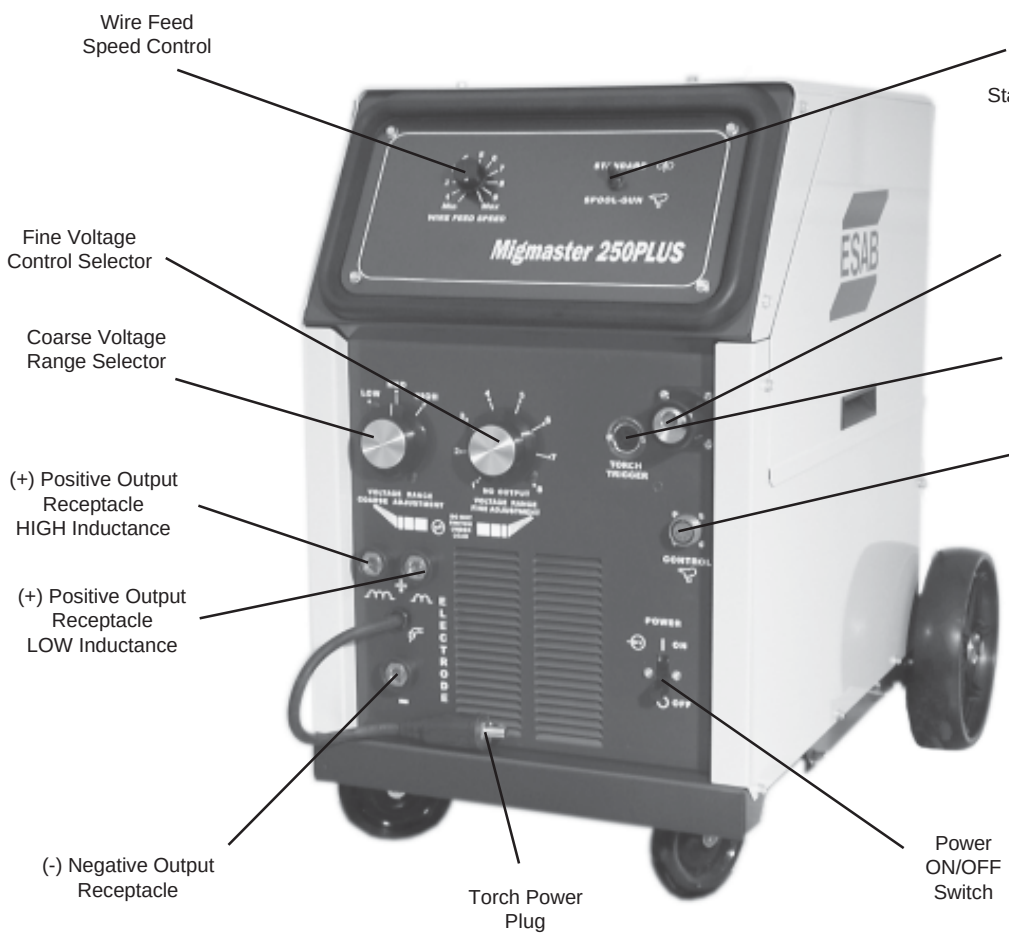


Figure 4.1 - Location of Controls

CAUTION:
These tap switches carry several hundred amperes, and must not be switched under load, as this will cause the contacts of the switches to arc.

4.1.1 POWER SWITCH

A line toggle switch on the front panel energizes the primary of the main transformer. This switch also turns on the fan, which is connected across a portion of the primary winding.

Two transformer secondary windings also become energized:

A. Gun trigger circuit 24 volts AC.
Wire feeder circuit 24 volts DC.

B. Main welding secondary circuit. Depending upon the tap switch position, various secondary voltages can be obtained. Then rectified, open circuit voltages can be selected between 18 and 56 volts DC when the secondary contactor is energized.

4.1.2 VOLTAGE CONTROL (Coarse Range Selector and Fine Adjustment Range Selector)

Voltage control is by means of two high current tap switches which connect the rectifier bridge to various secondary taps.

The **COARSE VOLTAGE RANGE Selector** is a three-position switch, LOW/MED/HIGH, by which the operator selects the approximate range of voltage (or heat, that determines the arc length) to be applied to the weld. It is a coarse selection control and is used in conjunction with the Fine Voltage Adjustment selector following. It must **not** be switched under load.

The **FINE VOLTAGE ADJUSTMENT Selector** is an eight-position switch by which the operator selects the exact amount of arc voltage (or heat) to be applied to the weld (within the coarse range selected above). This allows you to fine-tune the voltage required; the higher the number selected (1-8), the hotter the weld. The Fine Voltage Selector switch also has an "open" detent at the six o'clock position. Placing the switch in this position allows operation of the torch trigger to feed electrode wire without the wire being electrically "hot". This switch also, must **not** be switched under load.

4.1.3 SECONDARY WELDING CONNECTIONS

⚠ WARNING

Because of the charged capacitor bank in the secondary circuit, the output voltage will take a few seconds before falling to zero volts.

The secondary contactor is used to make and break the circuit between the transformer secondary and the rectifier. This contactor is turned on and off when the torch trigger (in the 24 volt circuit) is operated.

The secondary output welding terminals (3), POS.(+) High Inductance, POS.(+) Low Inductance, and NEG(-), are located on the lower left side of the front panel and are used to set the welding polarity (D.C.R.P. or D.C.S.P.) in which the machine will operate (see Fig. 4.1).

4.1.4 WIRE FEED SPEED CONTROL

Wire feed speed is controlled by the wire speed potentiometer knob on the front panel. The solid state control allows for infinitely variable speeds up to 650 IPM.

This wire speed pot is used to set the speed at which the welding wire is fed out from the torch and hence the welding amperage. The panel-face numbers on the dial (0-10) are used for reference and do not directly indicate wire feed speed; the higher the number, the faster the speed.

4.1.5 STD./SPOOL GUN SELECTOR

This two-position toggle switch is located on the upper right of the front panel and is labeled Standard and Spool Gun. It is used to select standard metal inert gas welding with the GUNMASTER 250, or welding with the ST-23A/MT-250GS (spool-on-gun) torch.

4.2 OPERATING PROCEDURES

4.2.1 OPERATING SAFETY PRECAUTIONS

Comply with all ventilation, fire and other safety requirements for arc welding as established in the SAFETY Section at the front of this manual.
Also remember the following:

A. Because of the radiant energy of the welding arc and the possibility of drawing an arc before the helmet is lowered over the face, the operator should wear flash goggles with filter lenses under his helmet. The helmet filter plated should be shade number 11 (nonferrous) or 12 (ferrous). All those viewing the arc should use helmets with filter plates, as well as flash goggles. Nearby personnel should wear flash goggles.
B. The radiant energy of the arc can decompose chlorinated solvent vapors, such as trichloroethylene and perchloroethylene, to form phosgene, even when these vapors are present in low concentrations. DO NOT weld where chlorinated solvents are present in atmospheres in or around the arc.
C. DO NOT touch the electrode, nozzle or metal parts in contact with them when power in ON: all are electrically energized (HOT) and can cause a possibly fatal shock. DO NOT allow electrode to touch grounded metal: it will create an arc flash that can injure eyes. It may also start a fire or cause other damage.
D. When working in a confined space, be sure it is safe to enter. The confined space should be tested for adequate oxygen (at least 19%) with an approved oxygen measuring instrument. The confined space should not contain toxic concentrations of fumes or gases. If this cannot be determined, the operator should wear an approved air supplied breathing apparatus. Avoid gas leaks in a confined space, as the leaked gas can dangerously reduce oxygen concentration in the breathing air. DO NOT bring gas cylinders into confined spaces. When leaving a confined space, shut OFF gas supply at the source to prevent gas from leaking into the space, if the switch is accidently kept depressed. Check the breathing atmosphere in the confined space to be sure it is safe to reenter.
E. Never operate the equipment at currents greater than the rated ampere capacity; overheating will occur.
F. Never operate equipment in a damp or wet area without suitable insulation for protection against shock. Keep hands, feet and clothing dry at all times.
G. Whenever the equipment is left unattended, turn all control and power supply switches and gas supplies OFF and open the main line switch.
H. Wear dark substantial clothing to protect exposed skin from arcburn, sparks and flying hot metal.
I. Turn off welding power before adjusting or replacing electrodes.

⚠ WARNING

Never operate the welding machine with any portion of the outer enclosure removed. In addition to a hazard, improper cooling may result in damage to the welding transformer and the welding machine components. Warranty is void if the machine is operated with any portion of the outer enclosure removed.

4.2.2 PRE-WELD REQUIREMENTS

Before welding commences, with all power OFF, check the following:

A. All safety requirements have been read and understood.
B. All hoses and cables are in good condition, safely insulated and securely connected.
C. Turn on gas supply by slowly opening cylinder valve to full ON.
D. Correct size wire accessories have been installed on the wire feeder, drive gears are meshed, wire pressure set, and guide tube is installed for type and size wire you plan to use, refer to Table 2.1.

E. Spool of correct size wire is locked in place, brake tension is set, and wire is properly threaded through the inlet guide to the gun tip.
F. The wire feeding compartment cover is closed and secure.
G. Make sure that the metal to be welded is properly prepared:
   a. Remove loose surface rust, scale or paint with wire brush or sander.
   b. Attempting to weld over grease or oil can cause weld defects.
   c. Before welding on aluminum, be sure to clean surface thoroughly using a stainless steel brush.

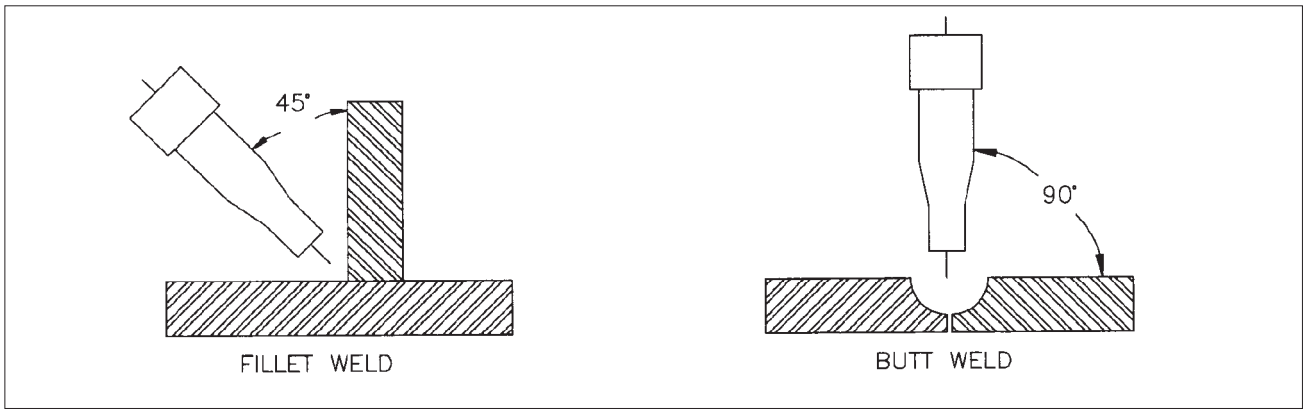
4.3 PROCESS SET-UP PROCEDURE

A. Determine the material type, thickness and joint configuration to be welded from Table 4.1 and use the recommendations to set the following:
   a. Coarse Voltage Range, LOW/MED/HIGH.
   b. Fine Arc Voltage Setting, 1 through 8 (the higher the number, the hotter the weld).
   c. Wire Speed setting, 0 through 10 (the higher the number, the faster the speed).
B. Set the two-position switch in the wire feeder compartment to STANDARD for seam welding with the GUNMASTER 250 torch. (For ST-23A Spool-On-Gun welding, see Section 4.5).
C. If optional Spot/Stitch/Anti-Stick Control module is installed, refer to Section 4.6 for operation, settings and welding condition table.
D. Make sure the GUNMASTER 250 torch fitting and the “Work” cable are connected to the proper output terminals (inside unit) for the polarity desired. Normally, you will set-up for “reverse polarity”; this means the torch fitting is connected to the POS (+) output terminal and the “Work” cable to the NEG (-) output terminal. For “straight polarity”, do just the opposite; torch fitting to NEG (-) output terminal and “Work” cable to POS (+) output terminal.

4.4 WELDING OPERATION

A. Turn Power switch (on unit) to ON position -- be careful not to operate the torch switch.
B. Before starting the weld, the welding wire should extend about 1/2-inch beyond the end of the nozzle. Adjust this length by either clipping off the end of the wire with insulated cutters or by using the torch switch.
C. To start the weld, hold the torch so the welding wire is approximately 1/4-in. from the work, then press the torch trigger.
D. The welding wire should be pointed into the joint at angles of approximately 45^0 for fillet welds, and approximately 90^0 for butt welds, (Fig 4.2).
E. The torch angle relative to the length of the weld should be approximately 10^0 from the vertical (Fig. 4.2).
F. When welding in the vertical position, traveling either up or down, it is very important to keep the arc on the leading edge of the puddle to ensure complete penetration.
G. Some welders who are accustomed to welding with stick electrodes may tend to push the torch into the weld. This is neither necessary nor desirable, since the wire electrode is being mechanically fed into the weld.
   Please note that the Wire Speed control can be adjusted for the gauge of metal to be welded. **However, the Coarse Voltage Range and Fine Voltage setting must not be switched while welding.**
H. To stop the weld, release the trigger and pull the torch from the work. When leaving equipment unattended, always shut OFF and disconnect all input power and shut off shielding gas at source.

This equipment is provided with a thermostat (OL) in the transformer (T1) windings which will open and prevent the contactor (CON) from closing if the transformer windings are overheated. If the thermostat opens, allow the equipment to idle with fan running for approximately 15-min. before attempting to weld again.



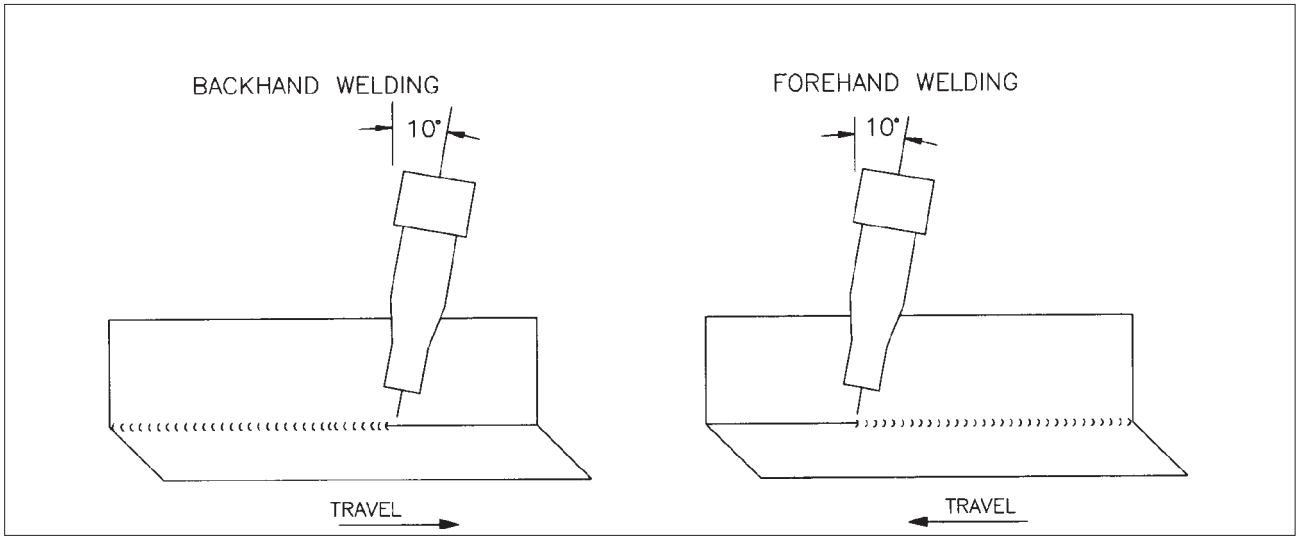
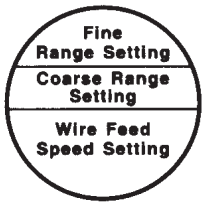


Figure 4.2 - Angle of Welding Wire with Joint

Table 4.1 Weld Setting

MM-250 WELD PARAMETER GUIDE



EXAMPLE

TO SET MACHINE

1. Find the type and thickness of material to be welded.
2. Find the diameter of the filler wire to be used.
3. Find the suggested fine and coarse voltage and wire feed setting by following the wire diameter row across (to the right) and the plate thicknesses column down.
4. Set the fine and coarse voltage selector switches and the wire feed pot to the settings indicated.

* For 100% carbon dioxide shielding gas, add 2 to the "Fine Range" setting shown.

CARBON STEEL BASE PLATE THICKNESS

WIRE DIAMETER	24 GA.	20 GA.	18 GA.	16 GA.	3/32"	1/8"	3/16"	1/4"	3/32"	1/8"	3/16"	1/4"
	SHORT CIRCUITING ARC (75 Ar - 25 CO2)*								SPRAY ARC (98 Ar - 2 02)			
.023"	1 LOW 1.2	2 LOW 1.3	3 LOW 2.5	4 LOW 3	6 LOW 4.3	1 MED 6.5	4 MED 10					
.030"			4 LOW 3	4 LOW 3.5	7 LOW 4	7 LOW 4.5	8 LOW 5	2 MED 5.5	5 MED 6	6 HIGH 6.5	7 HIGH 6.8	4 HIGH 8.5
.035"			3 LOW 1.8	4 LOW 2	6 LOW 3	6 LOW 3.8	1 MED 4	2 MED 4.5	5 MED 5.5	5 MED 5.5	6 MED 6	6 MED 6
.045"				4 LOW 1.8	5 LOW 2	6 LOW 2	6 LOW 2.8	3 MED 3	8 MED 4	8 MED 4	2 HIGH 4.2	2 HIGH 4.2

STAINLESS STEEL BASE PLATE THICKNESS

WIRE DIAMETER	24 GA.	20 GA.	18 GA.	16 GA.	3/32"	1/8"	3/16"	1/4"	3/32"	1/8"	3/16"	1/4"
	SHORT CIRCUITING ARC (Tri - Mix Gas)								SPRAY ARC (Argon - Oxygen)			
.030"			5 LOW 2.5	6 LOW 3	7 LOW 3.5	8 LOW 4.2	1 MED 5	1 MED 5	4 MED 6.2	4 MED 6.2	8 MED 8	8 MED 8
.035"				5 LOW 2.5	6 LOW 3	7 LOW 3.2	8 LOW 3.5	1 MED 3.7	5 MED 5	5 MED 5	6 MED 5.5	2 HIGH 6.5
.045"										8 MED 4.5	2 HIGH 4.7	2 HIGH 4.7

ALUMINUM BASE PLATE THICKNESS

WIRE DIAMETER	24 GA.	20 GA.	18 GA.	16 GA.	3/32"	1/8"	3/16"	1/4"	3/32"	1/8"	3/16"	1/4"
	EXAMPLE					SPRAY ARC with ARGON						
.030"	4000 ALLOY WFS — 2 HIGH 4.2 | 5.2 — 5000 ALLOY WFS					7 LOW 4.2 | 6	3 MED 6 | 9	7 MED 8 | N/A				
.035"	NOTE Wire feed speed (WFS) settings (aluminum only) shown were developed using the ST-23 Spool-on-Gun. The WFS number should be set on the ST-23 wire speed potentiometer (not the front panel of the MM-250 power source).					1 MED 4 | 5	4 MED 4.5 | 5.7	7 MED 6 | 7.5				
3/64"						2 MED 3.2 | 3.5	4 MED 3.7 | 4.2	7 MED 4.2 | 4.7				

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4.5 SPOOL-ON-GUN CONNECTION/OPERATION

The Migmaster 250 Plus is equipped with a built-in control for the ST-23A or MT-250SG Spool Gun which operates via the amphenol control receptacle and the front panel output receptacles.

To operate the unit an ST-23A or MT-250-SG, do the following:

A. Place the STD./Spool Gun selector toggle switch in the 250 Plus to its Spool Gun position.
B. Connect the MT-250SG / ST-23A control cable amphenol to the receptacle labeled CONTROL on the 250 Plus's front panel.
C. If using an MT-250SG, connect the power cable directly to the (+) positive Low Inductance output terminal.
   If using a ST-23A, connect the gas/power cable to the power cable adaptor (P/N 37301). Plug the adapter into the (+) positive Low Inductance output terminal (see Section 3.5).
D. If using an MT-250SG, connect the gas hose directly to the R-33-FM flowmeter regulator. Set the flow to 30 cfh.
   If using an ST-23A, connect the gas hose from the power cable adapter directly to the R-33-FM flowmeter regulator. Set the flow to 30 cfh.
E. Connect the 250 Plus's WORK cable to the workpiece.
F. Set Migmaster 250 Plus voltage tap switches to RANGE and FINE ADJUSTMENT VOLTAGE desired settings.
G. Turn on the Migmaster 250 Plus's power switch and begin welding.

If the optional Spot/Stitch/Anti-Stick control module is installed, the MT-250SG and the ST-23A gun may be operated using these optional features, see Section 4.6.

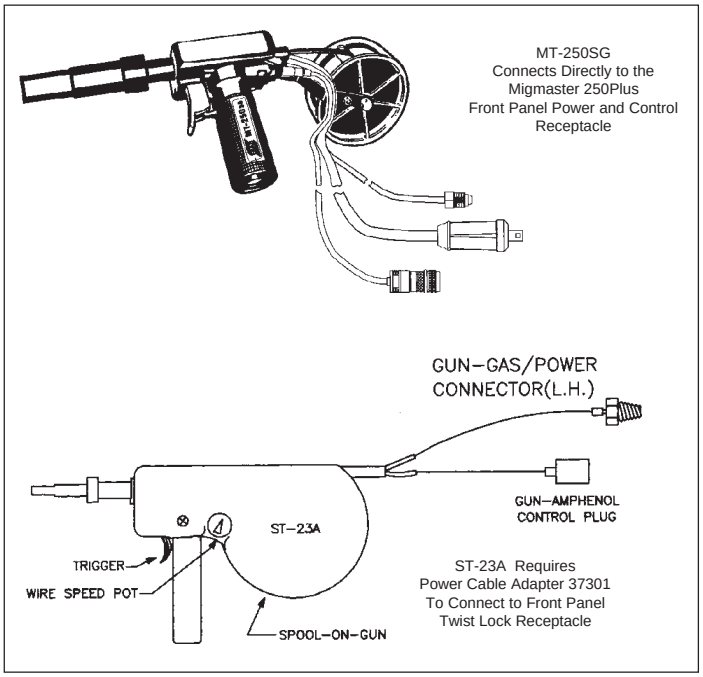


Figure 4.3 - Connecting Spool-On-Gun

4.6 OPTIONAL SPOT/STITCH/ANTI-STICK CONTROL MODULE

CAUTION

Power supply contactor becomes energized the moment the torch trigger is depressed. Arcing can occur if the wire is brought to a ground. Keep the torch always from ground until welding is to begin.

This optional control module allows the operator to use the 250 Plus for Spot or Stitch or Continuous welding operations. It also includes an adjustable Anti-Stick feature to select various burnback times to prevent wire from sticking in the puddle after a weld.

The module consists of three pots (one for Spot-Stitch Weld Time "ON", one for Stitch Weld Time "OFF", and one for Anti-Stick Time modes) and one three-position toggle switch to select the welding operation desired (Spot, Continuous or Stitch). For installation, see Section 3.9; for operation, see following:

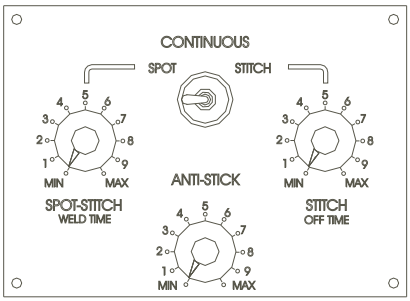


Figure 4.4 - Optional Spot/Stitch/Anti-Stick Control Module

4.6.1 ANTI-STICK WELDING OPERATION

Anti-Stick feature provides a time delay at the end of a weld from the time the torch trigger is released until the main contactor is deenergized. This delay allows the welding wire to burn back, away from the work, so it won't "stick" in the weld puddle.

This delay time, controlled by the "anti-stick" potentiometer, is variable from approximately 0.05 seconds to 0.5 seconds. The required delay time generally depends on the WIRE SPEED Adjustment setting on the front panel - the higher the setting, the faster wire will feed into the weld, and the more delay time will be required.

If, when using the Anti-Stick feature, the welding wire tends to stick in the puddle at the end of a weld, the Anti-Stick time should be increased; if, on the other hand, the wire burns back into the torch tip, the anti-stick time should be decreased. Setting the anti-stick time to "Min" effectively cancels the anti-stick feature.

This Anti-Stick feature is available for all three welding modes - Continuous, Spot, and Stitch.

4.6.2 CONTINUOUS WELDING MODE OPERATION

A. Place the three-position toggle switch in "Continuous" weld mode (center position) for mig seam welding.
B. Set the "Anti-Stick Time" as required.
C. Set the "coarse" and "fine" Voltage control switches and wire speed pot to the desired settings and begin welding operation as described in Section 4.4.

4.6.3 SPOT WELDING MODE OPERATION

A. Place the three-position toggle switch in “Spot” position.
B. Replace the standard nozzle with the No. 12 Spot weld Nozzle P/N 999625.
C. Trim the welding wire back so the end is slightly inside the nozzle.
D. Set the “coarse” and “fine” voltage control switches and wire speed, (see Table 4.1), for the thickness of the metal being welded and the diameter of the weld wire being used. Set spot time as desired for best weld.
E. To spotweld:
   a. Press the torch nozzle squarely on the top plate. Apply enough pressure to hold the two pieces of metal firmly together, so there is no loose play between them.
   b. Pull the trigger, holding the gun motionless and firmly. The electrode wire and shielding gas will be fed to the work, and the arc will be maintained for the length of time set in Step D. above.

   c. After the preset time has elapsed, the wire will stop feeding, the arc will be broken, and the shielding gas will stop flowing.
   A good spotweld will penetrate through both layers of metal, and will have a small nugget on the reverse side, (Fig. 4.5)

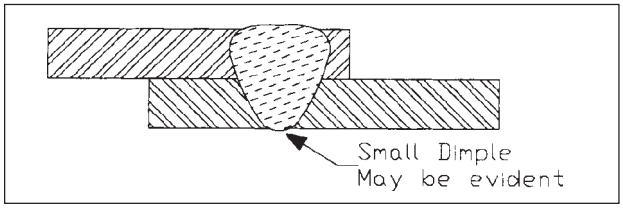


Figure 4.5 - Cross Section of Good Spotweld

4.6.4 STITCH WELDING MODE OPERATION

A. Place the three-position toggle switch in “Stitch” position. The stitch weld mode uses a series of pre-timed arc-on/arc-off time sequences to allow cooler welding.
B. Be sure a standard nozzle (and not a spot weld nozzle) is installed on the torch.
C. Set the length of time the arc will be ON for each sequence by adjusting the Spot-Stitch Weld Time control on the power supply’s front panel. This timer has an approximate range of from 0.4 seconds at the minimum setting to 3.5 seconds at the maximum setting. Set the length of time the arc will be OFF for each sequence by adjusting the Stitch Weld Time control on the front panel. This timer has an approximate range of from 0.4 seconds at the minimum setting to 3.5 seconds at the maximum setting.
D. Set the “coarse” and “fine” voltage control switches and wire speed as specified in Table 4.3 under Continuous Weld Conditions for:
   a. The type weld being made (see diagrams to the left of each column of figures).
   b. The thickness of the metal being welded.
   c. The gap (if any) between the pieces being welded.
   d. The diameter of the welding wire being used.
E. When using the Stitch weld mode, before starting the weld the welding wire should extend about 1/2-in. beyond the end of the nozzle. Adjust this length by either clipping off the end of the wire with insulated cutters or by using the torch switch.
F. During the welding, use the same welding techniques as described in Section 4.4.

WARNING

Be sure the branch circuit or main disconnect switch is off or electrical input circuit fuses are removed before attempting any inspection or work on the inside of the welding machine. Placing the power switch on the welding machine in the OFF position does not remove all power from inside of the equipment.

WARNING

Inspection, troubleshooting and repair of this equipment may ordinarily be undertaken by a competent individual having at least general experience in the maintenance and repair of semiconductor electronic equipment. Maintenance or repair should not be undertaken by anyone not having such qualifications.

5.1 MAINTENANCE

Shut OFF shielding gas supply at source.
To aid in checking and servicing, use Schematic, Figure 5.1.

5.2 INSPECTION AND SERVICE

Keep Equipment in clean and safe operating condition free of oil, grease, and (in electrical parts) liquid and metallic particles which can cause short-circuits.

Regularly check cylinder valves, regulators, hoses, and gas connections for leaks with soap solution.

Check for and tighten loose hardware including electrical connections. Loose power connections overheat during welding.

Immediately replace all worn or damaged power cables and connectors. Check for frayed and cracked insulation, particularly in areas where conductors enter equipment.

The electrode wire and all metal parts in contact with it are electrically energized while welding. Inspect these parts periodically for defective insulation and other electrical hazards.

Keep power cables dry, free of oil and grease, and protected at all times from damage by hot metal and sparks.

Clean dirt and metal particles from drive roll groove weekly; replace roll if badly worn.

5.2.1 POWER SOURCE

WARNING

If uninsulated cable and parts are not replaced, an arc caused by a bared cable or part touching a grounded surface may damage unprotected eyes or start a fire. Body contact with a bared cable, connector, or uncovered conductor can shock, possible fatally.

5.2.1.1 RECTIFIER

It is recommended that the rectifier be cleaned occasionally by blowing it out with compressed air. This cleaning operation is necessary so that maximum cooling will be accomplished by the air stream. This should be done periodically, depending upon the location of the unit and the amount of dust and dirt in the atmosphere.

The hermetically sealed silicon diode rectifiers are specially designed for welding machine use and will not age or deteriorate in use. The four diodes are mounted on heat sinks. A periodic cleaning of dust and dirt from these is necessary to insure cooling of the rectifiers. Access is by removal of top cover and side panels. Should any diode accidentally be damaged and need replacement, it can be quickly removed from the heat sink. The replacement diode should be of the same type as the one removed, and should be locked securely to the sink, preferably with a torque wrench set for maximum of 25 ft. lbs. and a minimum of 20 ft. lbs. Excessive torque will distort the mechanical structure and may break the hermetic seal, whereas too little torque will result in improper electrical connections.

NOTE: Thermal conductive compound (Wakefield Engineering #120 Thermal Compound or equivalent) must be reapplied to heat sink-diode mating surface whenever a diode is replaced.

5.2.1.2 FAN MOTOR

All models are equipped with an exhaust fan and rely on forced draft for adequate cooling for high duty cycles and overloads. Lubricate the fan motor with a few drops of SAE-20 non-detergent oil every three months.

5.2.1.3 TRANSFORMER

Occasional blowing out of the dust and dirt from around the transformer is recommended. This should be done periodically depending upon the location of the unit and the amount of dust and dirt in the atmosphere. The welding machine case cover should be removed and a clean, dry air stream should be used for this cleaning operation.

5.2.1.4 24 VOLTS WIRE FEEDER AND CONTROL CIRCUITS

The 24-volts circuit is protected by a 10 amp fuse in a panel mounted fuseholder, accessible from the wire feeder compartment. Failure of this fuse will shut off the contactor, shielding gas and wire feeder.

5.2.1.5 OVER-TEMPERATURE PROTECTION

The machine is equipped with a thermostat. On continued high current application, if the thermostat reaches an abnormally high temperature, it will deenergize the contactor. This thermostat will reset itself automatically after the transformer windings have cooled to a safe level. While deenergized, neither the contactor, shielding gas nor wire feeder can be operated.

CAUTION

If it should become necessary to replace this or any other fuse in the welding machine, ensure that the proper size fuse is used as a replacement.

5.2.2 WIRE FEEDER

When soft wire is fed, the drive rolls may pick up metal from the wire surface. Accumulation on the rolls may score the wire with resulting unwanted friction and improper feeding.

Inspect the rolls regularly and clean them with a fine-wire power brush. Avoid roughening, or removing the hardness of groove surfaces in grooved rolls. Any roughening may score the wire, just as the accumulation being removed may do.

5.3 TROUBLESHOOTING

If welding equipment doesn't work right despite compliance with checklist inspect as follows:

A. With all power controls ON and other operating controls at required settings, visually check all power cables and connections for evidence of overheating or sparking.
B. Check all gas (and water) hoses and connections, flowmeters, and regulators for possible sources of leakage, breakdown or intermittent failure.
C. Isolate trouble to one part of the welding installation: primary power supply, power source, Feeder or wire guide train (casing, drive rolls, liners and contact tip). If this inspection indicates trouble in the Feeder, use Troubleshooting Guide, Table 5.1 and schematic diagram (Figure 5.1).

5.3.1 IF MOTOR DOES NOT RUN:

A. Check for blown fuse. If blown, check that motor is not binding before replacing fuse.

WARNING

To avoid shock, do NOT touch electrode wire or parts in contact with it, or uninsulated cable or connections.

B. Check for continuity across speed potentiometer (POT) and wiper contact. Voltage from center tap to MIN end should vary from 0 to 5.4 VDC as potentiometer is rotated clockwise.

C. Check wiring for continuity. Then turn power ON and check for 30 Vdc across input terminals 8 and 9 on the feeder printed circuit board connector (PL1).

D. Press torch trigger, and check for voltage across motor (Pins 4 to 7) of speed control board; should vary from 1 to 24 VDC as speed control potentiometer is rotated clockwise.

WARNING

Many troubleshooting situations require that the power remain On and that power terminals in the equipment carry voltage. Exercise extreme caution when working on "LIVE" equipment. Avoid contact with electrical components, except when testing with an appropriate instrument.

CAUTION

Do not make any repairs to equipment unless you are fully qualified, as described in the maintenance section.

5.3.2 DRIVE ROLL PRESSURE ADJUSTMENT

Adjust the drive roll pressure knob until no wire slippage occurs. DO NOT OVERTIGHTEN - EXCESSIVE PRESSURE CAN CAUSE WIRE FEEDING PROBLEMS.

General Replacement

The exploded views in the Parts Section indicate generally, in numbered parts sequence, the disassembly of the wire drive and feeder parts.

Reassemble in reverse order.

5.3.3 SOLENOID VALVE REPLACEMENT

When replacing the gas solenoid valve, the inlet (with the word IN) must face the rear of the Unit.

TABLE 5.1 TROUBLESHOOTING GUIDE

WELD CONDITION	POSSIBLE CAUSE	REMEDY
1. No weld or control power.	a. Primary input power not available. b. Faulty connection, primary input cable, or power switch (S3) c. Blown line fuse.	a. Check for Voltage at primary input. b. Repair or replace cable or switch (TGS1) as necessary. c. Replace fuse. If it blows again, contact ESAB representative.
2. No welding power.	a. Thermostat has opened. b. Shorted diode in main rectifier. c. Open in wiring	a. Wait 15 minutes with fan running. If still no power, contact ESAB representative. b. Check diodes and replace if req'd. c. Check all wiring.
3. Fan does not run.	a. See Weld Condition 1. b. Malfunctioning fan motor (M1)	a. Repair or replace cable or switch as necessary. b. Replace fan motor (M1).
4. Erratic welding current.	a. Poor workpiece connection. b. Loose welding connections. c. Wrong polarity.	a. Check workpiece grounding connection. b. Check all connections. c. Check for correct polarity.
5. Welding output Voltage and/or current too low.	a. Low line Voltage. b. Welding cables too long or too small. c. Loose connection. d. Malfunctioning capacitor bank.	a. Use correct Voltage. b. Use correct cable size. c. Check all welding cable connections. d. Check capacitors for low leakage resistance.
6. Stringy irregular bead, poor penetration.	a. Torch moved too fast. b. Controls are not set properly for metal gauge thickness. c. Wrong polarity.	a. Move Torch slower along seams. b. Reset control properly. c. Check for correct polarity.
7. Bead not centered.	a. Nozzle not aligned.	a. Move Torch nozzle parallel to and centered over seam.
8. Bead too large.	a. Torch moved too slowly.	a. Move Torch faster along seam.
9. Unstable arc, excess spatter, weld porous.	a. Incorrectly set controls. b. Shield gas flow is too low or stopped. c. Torch nozzle is too far from work. d. Faulty regulator or adapter. e. Faulty gas solenoid valve (SOL). f. Wrong polarity.	a. Reset controls. b. See Condition 10. c. Maintain 1/4" (.6 mm) wire protrusion; hold closer to work. d. Check flow at outlet; replace faulty item. e. Replace solenoid valve. f. Check polarity.

TABLE 5.1 TROUBLESHOOTING GUIDE (continued)

WELD CONDITION	POSSIBLE CAUSE	REMEDY
10.Shield gas flow low or stopped	a. Cylinder valve closed.	a. Turn off regulator, slowly open valve, until regulator reaches 35 c.f.h. pressure.
	b. Cylinder empty.	b. Replace if gauge so indicates.
	c. Faulty regulator or adaptor.	c. Check flow at outlet; replace faulty item.
	d. Faulty gas solenoid valve.	d. Replace solenoid valve.
11.Wire stubs on work while welding.	a. Controls not set properly for metal gauge, thickness.	a. Reset controls properly.
12.Wire burns back into contact tip.	a. Contact tip loose.	a. Firmly tighten with pliers.
	b. Tip too close to work.	b. Maintain 1/4" (.6 mm) wire protrusion; hold Torch further from work.
	c. Wire feed slipping.	c. Increase pressure on pressure roll by adjusting pressure knob.
	d. Contact tip damaged.	d. Trim back tip 1/16" (1.6 mm) max. Replace if still faulty.
	e. Voltage setting too high.	e. Adjust setting.
	f. Drive or pressure roll dirty or worn.	f. Clean rolls or replace.
13.Wire does not feed; motor running (drive roll turns).	a. Kink, etc. in wire, or wire bound on reel.	a. Straighten; or feed wire until clear and cut off.
	b. Wire freezing to contact tip (burnback).	b. Free freeze, or remove contact tip feed wire until clear cut end free, and replace tip.
	c. Clogged liner.	c. Replace liner.
14.Wire does not feed; motor NOT running (drive roll does not turn).	a. Motor	a. With wire speed dial on 10, press trigger. If voltage appears across motor leads but motor does not run, check motor gears and commutator areas.
	b.Power switch S3 and fuses.	b. With S3 ON, if voltage across terminal 1 and 3 is 24 VAC, switch and fuses are good.
	c. Speed Potentiometer (POT).	c. Check for 1K ohms across POT outside terminals.
	d. Malfunctioning speed control board.	d. Check board voltages (Para 5.3.1 b. and c.)
15.Wire feed does not stop.	a. Torch trigger switch.	a. Check continuity of Torch trigger circuit; check to see if trigger lever is stuck in “ON” position.
	b. Malfunctioning relay (K3).	b. Check for proper action.
16.Gas continues to flow after trigger release.	a. Gas solenoid valve stuck open.	a. Tap solenoid or click on and off to clear valve.

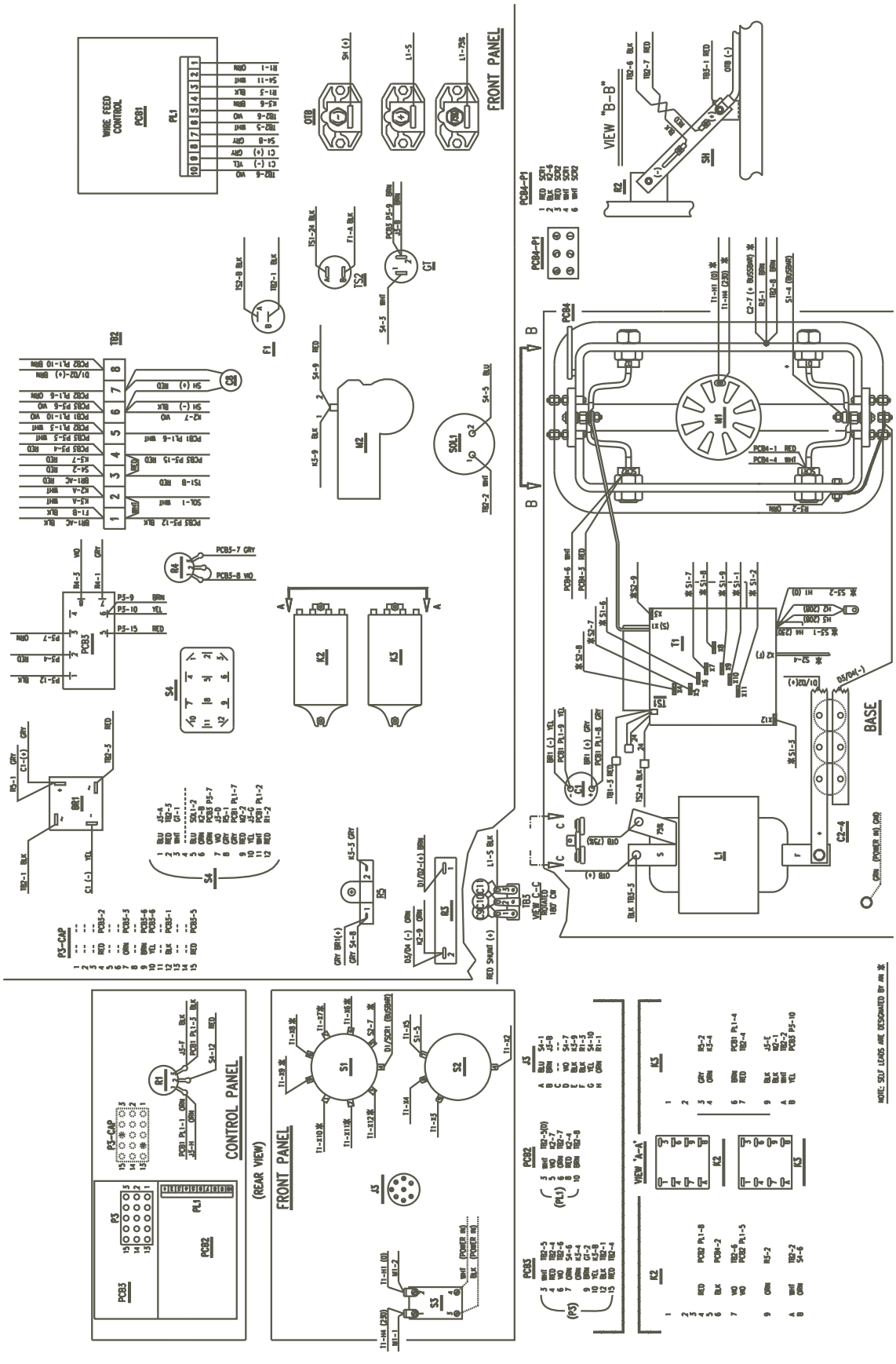


Figure 5.3 - Wiring Migmaster 250 Plus for 208/230V Model

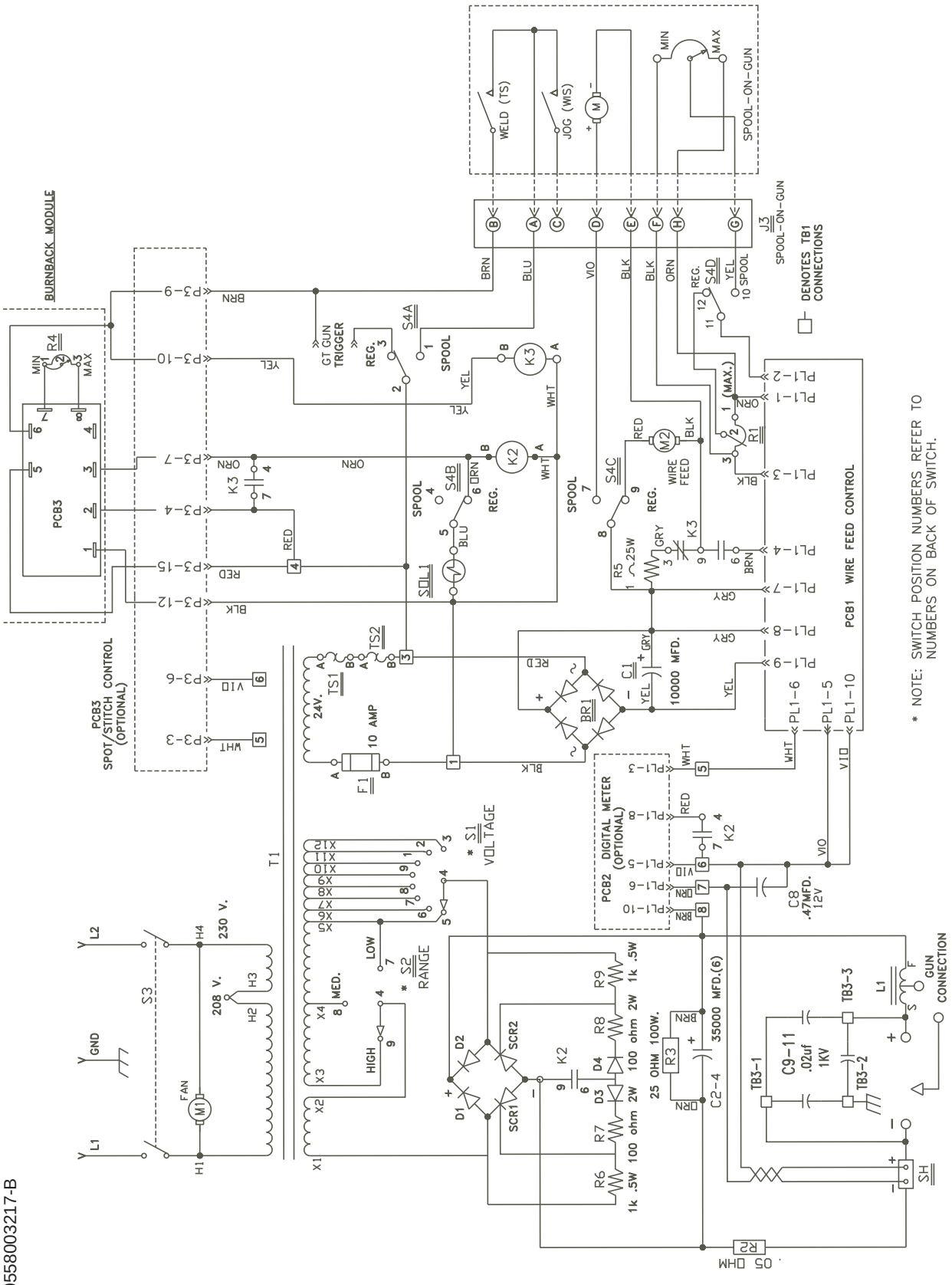


Figure 5.4 - Schematic Migmaster 250 Plus for 208/230V Model

0558003217-B

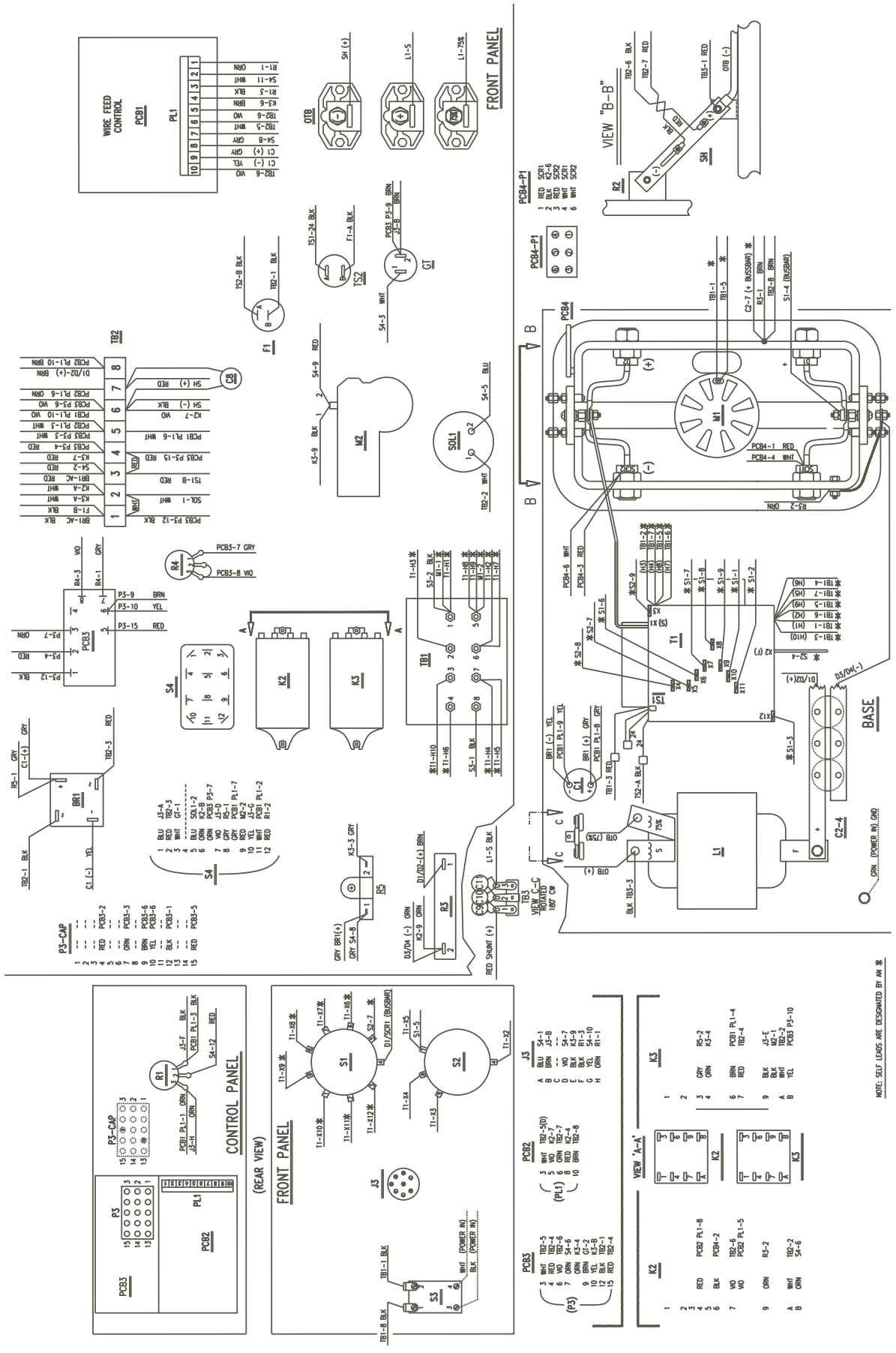


Figure 5.5 - Wiring Migmaster 250 Plus for 200 - 575V Model

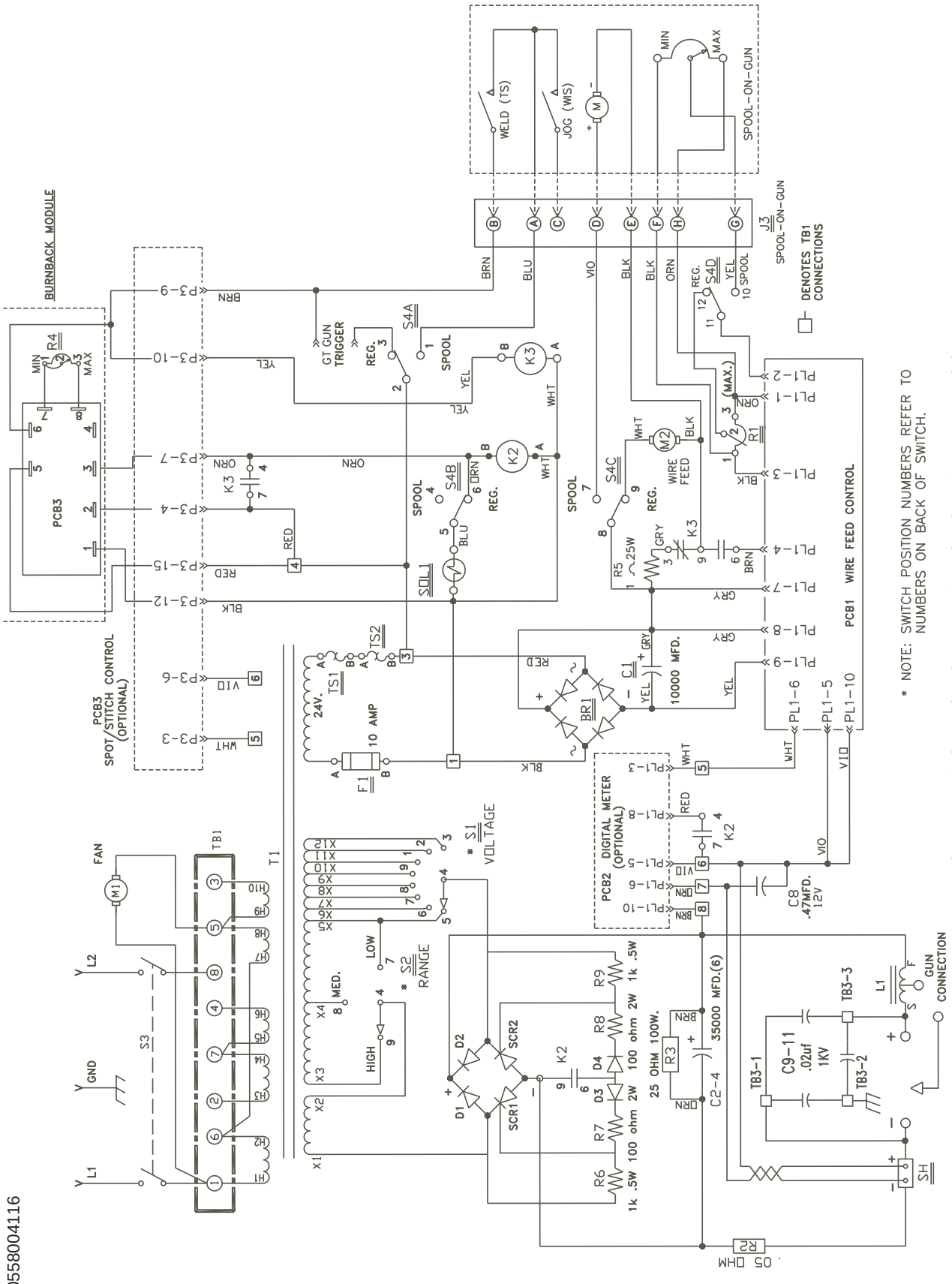


Figure 5.6 - Schematic Migmaster 250 Plus for 200 - 575V Model

0558004116

A. REPLACEMENT PARTS

When ordering replacement parts, order by part number and part name, as illustrated on the figure. Always provide the series or serial number of the unit on which the parts will be used. The serial number is stamped on the unit nameplate.

B. ORDERING

To assure proper operation, it is recommended that only genuine ESAB parts and products be used with this equipment. The use of non-ESAB parts may void your warranty.

Replacement parts may be ordered from your ESAB distributor or from:

ESAB Welding & Cutting Products
Attn: Customer Service Dept.
P.O. Box 100545, 411 S. Ebenezer Road
Florence, SC 29501-0545

Be sure to indicate any special shipping instructions when ordering replacement parts.

To order parts by phone, contact ESAB at 1-843-664-5540. Orders may also be faxed to 1-800-634-7548. Be sure to indicate any special shipping instructions when ordering replacement parts. Refer to the Communication Guide located on the last page of this manual for a list of customer service phone numbers.

This is a new product. This temporary manual provides you with the information needed to safely install and operate this unit. Specifications and other details may be subject to change.

Once the manual has been completed, ESAB will make it available for FREE download from the WWW.ESABNA.COM site under the DOWNLOAD LIBRARY option on the MAIN MENU. If you prefer, a final printed copy of this manual may be obtained, FREE of CHARGE, by completing the information below.

Mail or fax this form to:

ESAB WELDING AND CUTTING PRODUCTS
Marketing Communications Department
P.O. Box 100545
Florence, SC 29501-0545

Fax: (843) 664-5548

When available, please send a copy of this manual F15-728-A, “Instruction Manual for the MIGMASTER 250 Plus” to:

Company: _____

Attention: _____

Street Address/P.O. Box: _____

City, State, Zip: _____

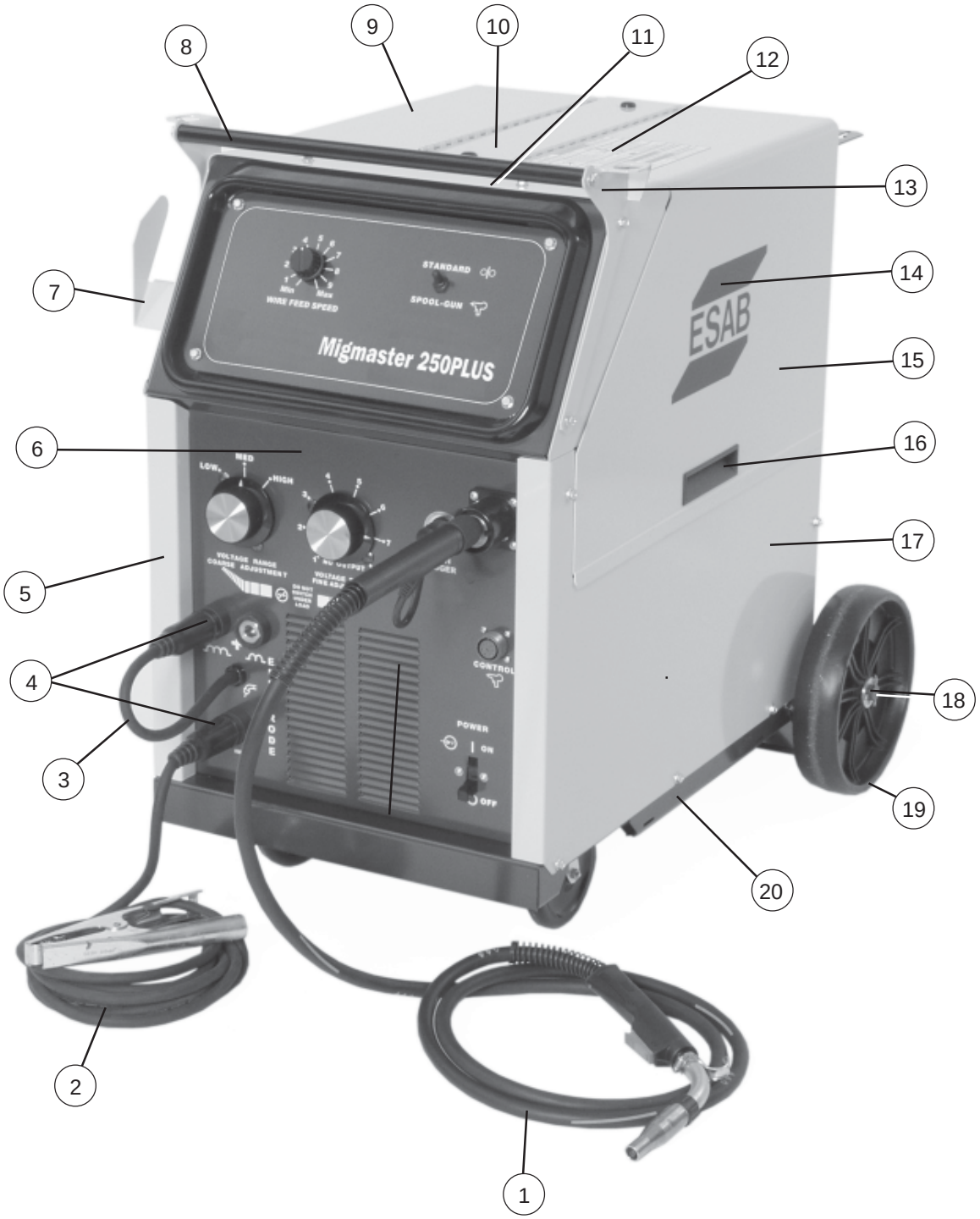


FIGURE 6.1 - MIGMASTER 250 Plus

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	CIRCUIT DESIGNATION
		0558003215	Migmaster 250, 208/230Vac *(console only)*	
		0558003216	Migmaster 250, 208/230/380/400/460/575Vac *(console only)*	
1	1	See Package Info.	GunMaster 250	
2	1	35881	Work Cable Assembly	
3	1	0558003235	Cable, Polarity Assembly	
4	2	13733936	Quick Connect, Male 2/0	
5	1	0558002544Y	Cover, Lower Left	
	1	0558004104Y	Cover, Lower Left, 575V	
6	1	0558003225M	Panel, Lower Front	
7	1	0558001702Y	Handle, Left	
8	1	0558003440	Handle, Shaft	
9	1	0558002546Y	Door, Tool Box	
10	1	0558002545Y	Cover, Top Rear	
11	1	0558003236Y	Cover, Front Top	
12	1	954506	Label, ISO Warning	
13	1	0558001703Y	Handle, Right	
14	2	13734588	ESAB Decal	
15	1	0558002555Y	Door, Top Right	
16	1	0558001858	Handle, Recessed	
17	1	0558002592Y	Cover, Lower Right	
18	1	0558001699M	Axle	
19	2	0558001576	Wheel, Spoke 10"	
20	1	0558003227M	Base	
21	1	0558001815	Trigger lead	

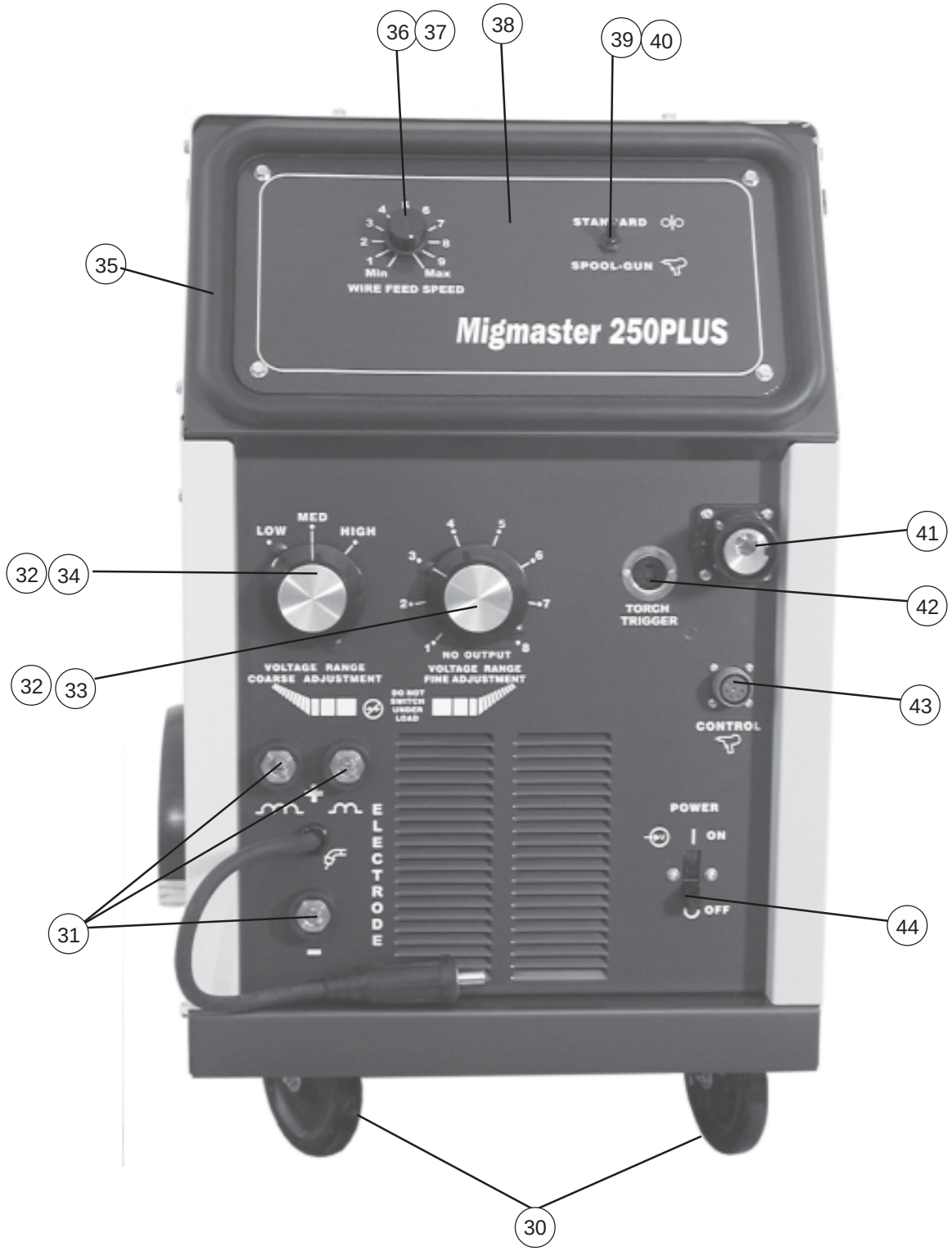


FIGURE 6.2 - MIGMASTER 250 Plus (Front)

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	CIRCUIT DESIGNATION
30	2	950396	Caster, Swivel 5"	
31	3	13733935	Output Receptacles	
32	2	2062171	Knob	
33	1	32818	Switch, Eight Position	S1
34	1	32902	Switch, Three Position, Range	S2
35	1	0558001033	PCB Box	
36	1	0558001019	Knob, Wire Speed	
37	1	23603918	Potentiometer, Wire Speed	
38	1	0558003223	Panel, Electronics Access	
39	1	951474	Switch Seal	
40	1	8634519	Switch	SW
41	1	0558001492	NAS Torch Adapter	
42	1	182W64	Receptacle, Twist Lock	
43	1	647233	Connector, 8 Pin	
44	1	950721	Switch, On/Off	
45	1	951649	Input Power Cable	
46	1	997887	Gas Hose, 1/4" (sold by the foot)	
46	1	136208	Nut, 5/8-18 RH	
46	1	11N22	Nipple	
47	1	0558001856M	Dual Cylinder Bracket	
48	1	634709	Fuse Holder	
49	1	13735464	Fuse, Slo-Blow	
50	1	0558002490	Fan Motor	
51	1	950592	Fan Blade	

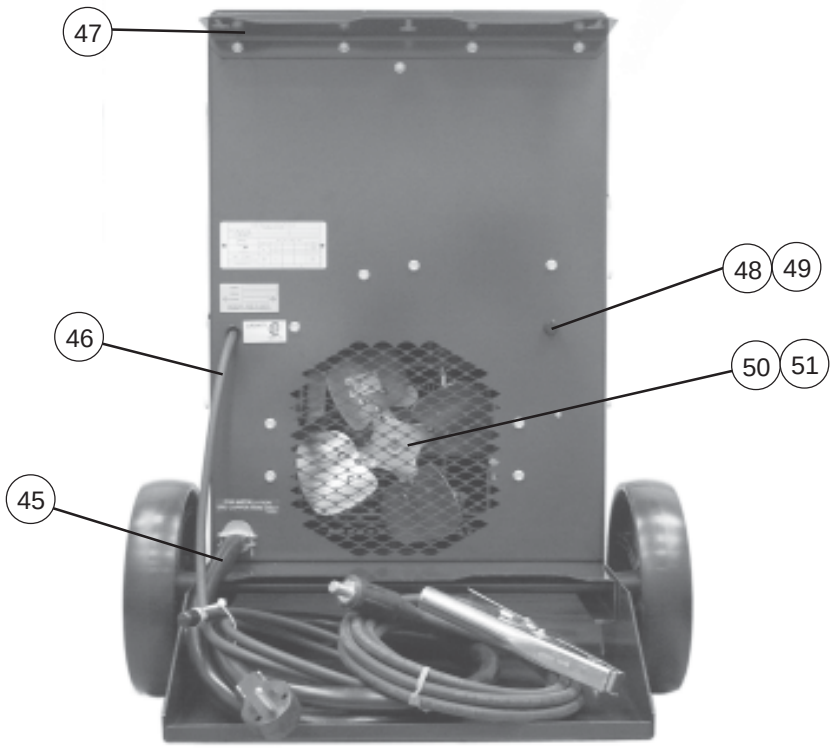


FIGURE 6.3 - MIGMASTER 250 Plus (Rear)

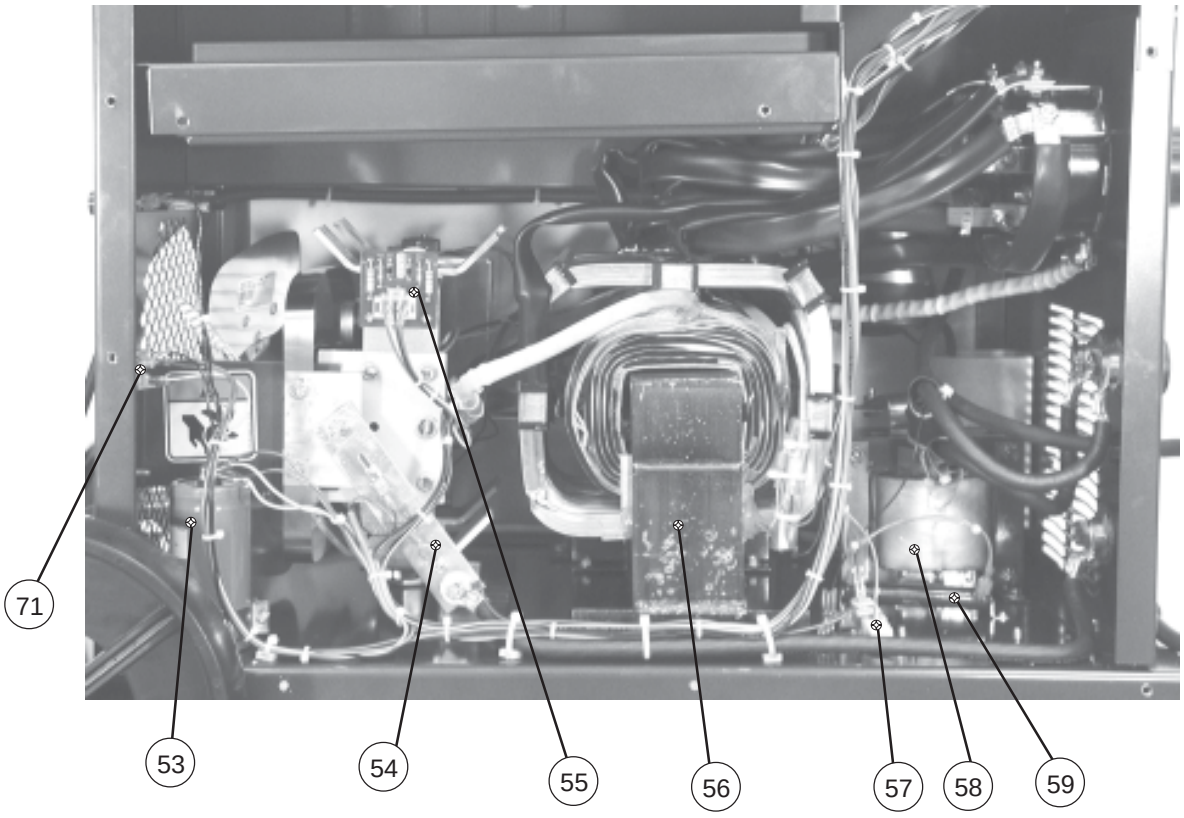


FIGURE 6.4 - MIGMASTER 250 Plus Main Assembly (Right Side)

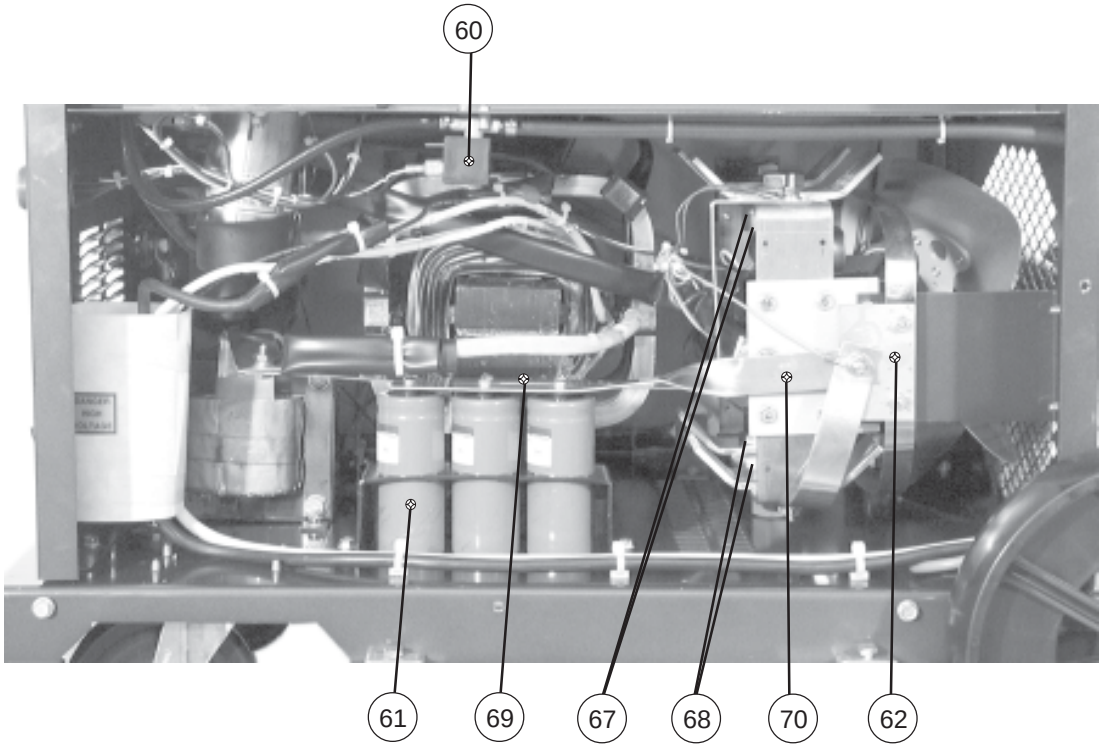


FIGURE 6.5 - MIGMASTER 250 Plus Main Assembly (Left Side)

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	CIRCUIT DESIGNATION
53	1	13732230	Capacitor	C1, C7
54	1	31563	Shunt	SH
55	1	38234	PCB, SCR Driver	
56	1	13736750	Main Transformer, 208/230	T1
56	1	33176	Main Transformer, 208/230/380/400/460/575	T1
57	1	13735289	Resistor, 25w	R5
58	1	0558003237	Inductor	
59	1	17280025	Resistor	R3
60	1	951634	Solenoid	SOL1
61	3	952565	Capacitor, 35,000 mfd	
62	1	13731597	Slope Resistor	
63	1	23608111	Terminal Strip	
64	1	0558007736	Relay	K3
65	1	0558007736	Relay	K2
66	1	31484	PCB, Motor Control	PCB1
67	2	99511916	Diode, FDW 200V 250A	
68	2	952564	SCR, 180A	
69	1	0558003228	Busbar, Positive	
70	1	0558003229	Busbar, Negative	
71	1	13730469	Rectifier, 35A	

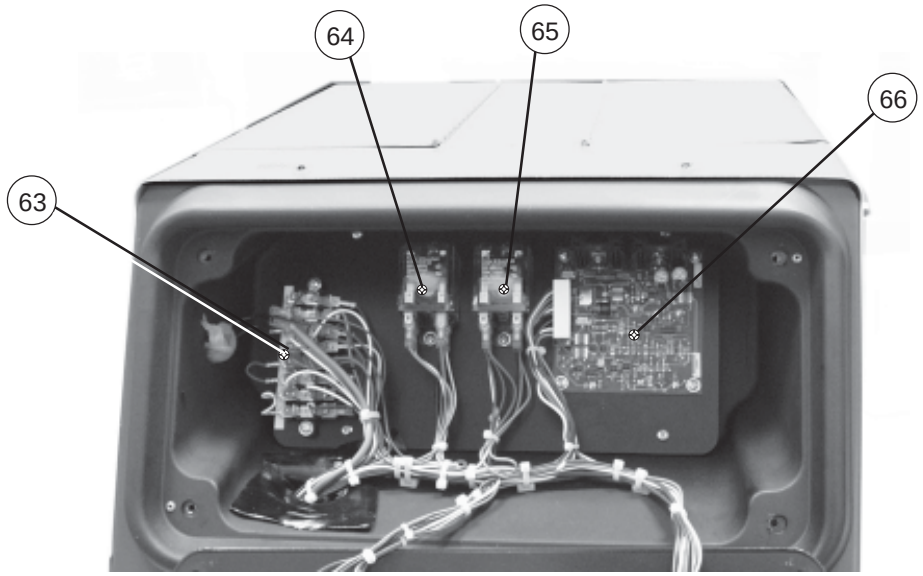


FIGURE 6.6 - MIGMASTER 250 Plus Electronics Compartment

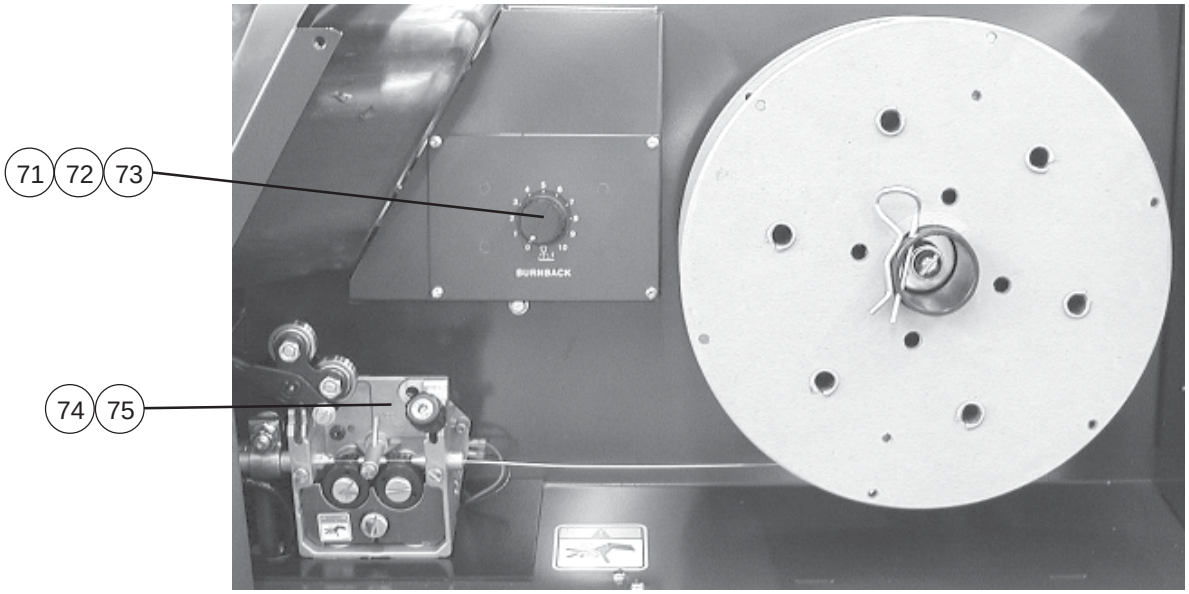


Figure 6.7 - Feeder Compartment

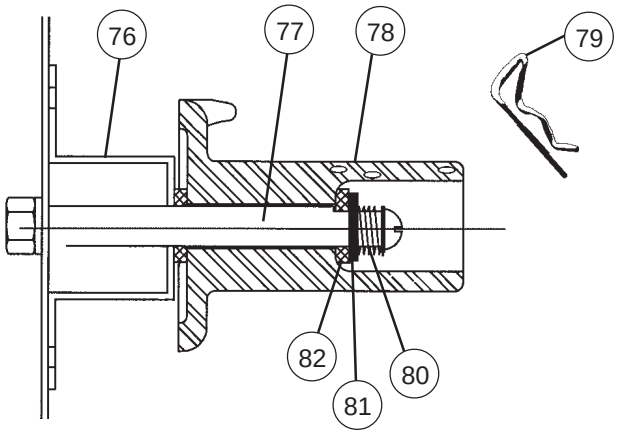
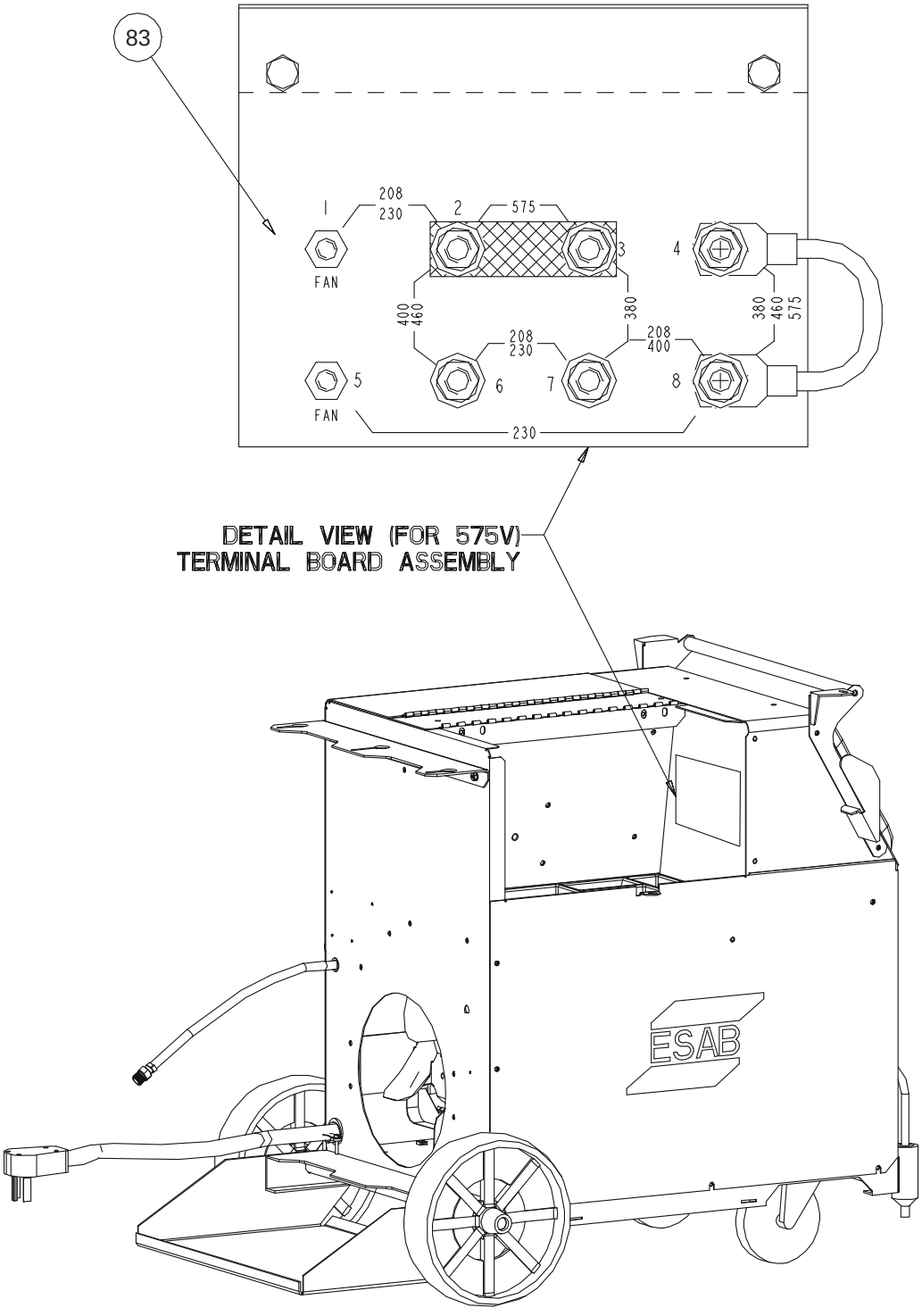


FIGURE 6.8 - MIGMASTER 250 Spool Spindle Assenbly

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	CIRCUIT DESIGNATION
71	1	0558001410	Potentiometer, Burnback 350K, 2W	R4
72	1	0558001818	Knob, Burnback	
73	1	38243	PCB, Burnback	
74	1	0558001339	Drive Stand, Compact 4 Roll	
75	1	0558002558	Motor, Wire Drive	
76	1	0558002561M	Wire Spool Mounting Bracket	
77	1	36756	"D" Shaft	
78	1	948258	Spindle	
79	1	634347	Clip	
80	1	23600982	Spring	
81	1	23600952	"D" Washer	
82	1	948255	Brake Pad	
83	1	33431	Terminal Board, 575V	


83
1
208
230
2
575
3
4
FAN
400
460
380
208
230
208
400
380
460
575
5
6
7
8
FAN
230
DETAIL VIEW (FOR 575V)
TERMINAL BOARD ASSEMBLY
ESAB

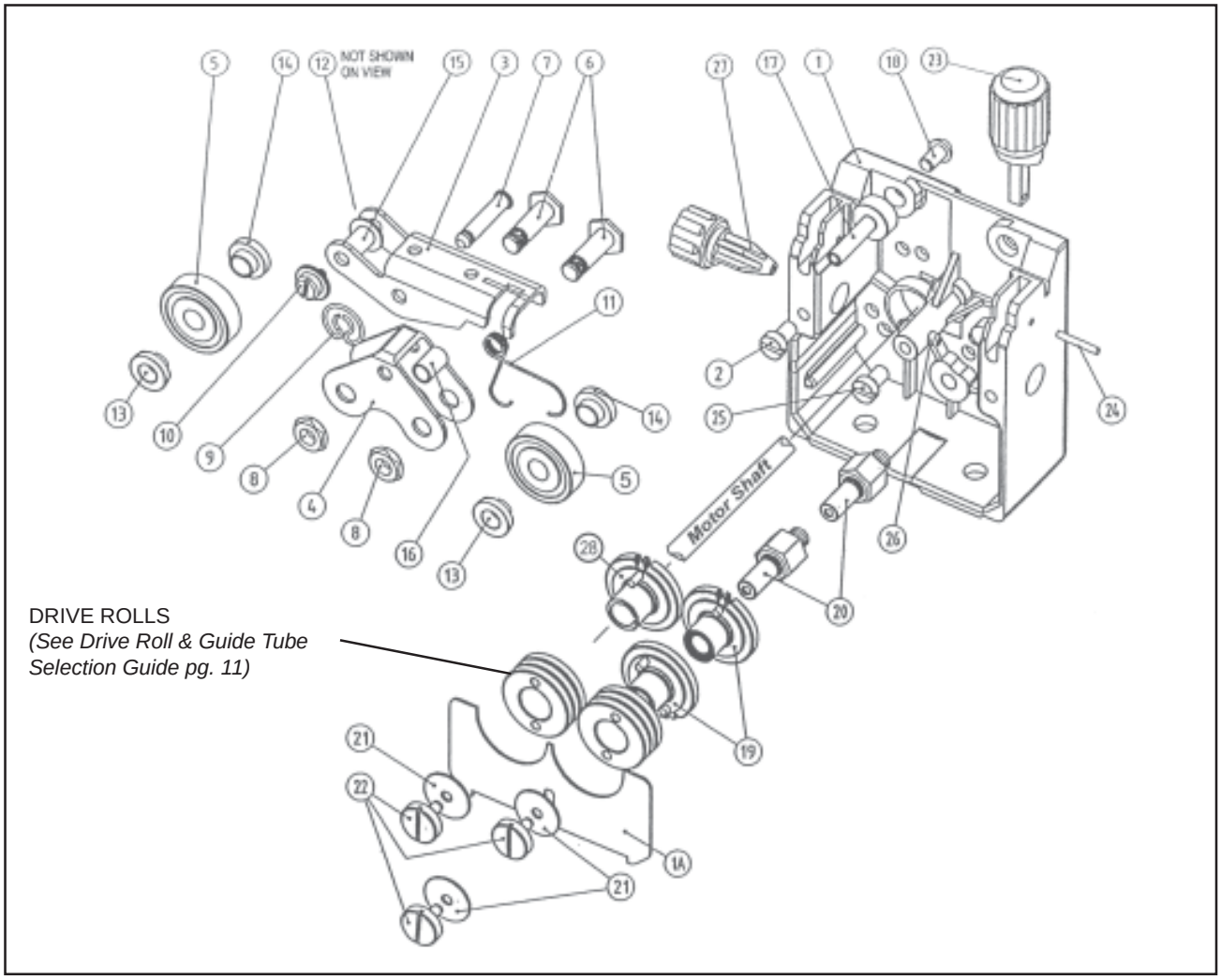


Figure 6.9 - Auto-Lift Mini Four Roll Geared Wire Drive System - 0558001339

ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
1	0558003543	Feed Plate	1	15	0558001752	Spacer Tube Pressure Arm Auto Lift	1
1A	0558001744	Safety Guard	1	16	0558001753	Spacer Tube Bogie	1
2	952927	Screw, Thumb (M6X12)	1	17	0558001754	Axle Pressure Arm	1
3	0558001745	Pressure Arm	1	18	0558001755	Allen Screw	1
4	0558001746	Bogie	1	19	23612386	Gear Adaptor Feed Roll	2
5	23612368	Pressure Roll	2	20	0558003540	Axle Gear Adaptor Feed Roll	2
6	23612477	Axle Pressure Roll	2	21	34608	Washer, Retaining Screw	3
7	0558001747	Locating Pin	1	22	952925	Knurled Screw	3
8	23612474	Nut, Pressure Roll Axle	2	23	23612460	Pressure Device W/Scale	1
9	23612472	Circlip	1	24	23612470	Locating Pin, 2.5 x 12 Pressure Device	Pkt. 5
10	34609	Retaining Screw Pressure Arm	1	25	0558003541	Screw Intermediate Guide	1
11	0558001748	Spring Bogie Auto Lift	1	26	0558001757	Center Guide (Hard Wire)	1
12	0558001749	Spring to Pressure Arm Auto Lift	1		0558001895	Center Guide for (Aluminum)	1
13	0558003538	Spacer Tube, Small	2	27	0558003544	Inlet Guide (Aluminum & Steel)	1
14	0558003539	Spacer Tube, Big	2	28	0558003542	Main Gear Drive	1

REVISION HISTORY

1. The "A" revision of this manual updates the replacement parts section and wiring/schematic diagrams throughout this manual. Various editorial changes have also been made. See dneco number's 023380, 023398 & 023428.

2. The "B" revision of this manual updates the replacement parts section and wiring/schematic diagrams throughout this manual. See dneco number 033113.

3. The "C" revision of this manual updates the replacement parts Pages 54 and 55. Added Item 71 and corrected numbering of Item 59 per Joe DeVito red-line dated 8/22/03.

4. The "D" revision of this manual updates replacement parts Page 55. Changed Item 65 from 950760 to 0558007736 per Mike Palumbo e-mail.

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A. CUSTOMER SERVICE QUESTIONS:
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Order Entry — Product Availability — Pricing, Order Information, Returns

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Telephone: (843) 664-4416 / Fax : (800) 446-5693 — **Hours: 7:30 AM to 5:00 PM EST**
Warranty Returns — Authorized Repair Stations — Welding Equipment Troubleshooting

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Telephone: (800) ESAB-123/ Fax: (843) 664-4452 — **Hours: 8:00 AM to 5:00 PM EST**
Part Numbers — Technical Applications — Specifications, Equipment Recommendations

D. LITERATURE REQUESTS:
Telephone: (843) 664-5562 / Fax: (843) 664-5548 — **Hours: 7:30 AM to 4:00 PM EST**

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Telephone: (843) 664-4487 / Fax: (843) 664-5557 — **Hours: 7:30 AM to 3:30 PM EST**
Repair Estimates — Repair Status

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Telephone: (843)664-4428 / Fax: (843) 679-5864 — **Hours: 7:30 AM to 4:00 PM EST**
Training School Information and Registrations

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Telephone: (800) ESAB-123
Fax: (843) 664-4452
Hours: 7:30 AM to 5:00 PM EST

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